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Electron in doubt after Acorn rescue

ACORN'S financial rescue, mounted last week by Italian office computer giant Olivetti – to save the company from a £10 9m loss for the six-month period ending December 31 – will mean a reduced involvement by Acorn in the low-cost home computer market.

Instead, the company is to now concentrate its efforts in the consumer market at the £250 plus range where it is firmly established with its BBC micro

A successor for the BBC is still expected but the Electron, after its failed attempt to crack the games computer market, now seems unlikely to be pursued

Acorn's restructuring, following the Olivetti deal, also means that the company will not now go ahead with plans to launch its ABC range of business computers Instead, the technology will be sold perhaps to Olivetti, but not marketed under the Acorn name. The first such licenced product is likely to be The Communicator, Acorn's micro-plus telephone

Under the rescue plan Olivetti will pay £10 39m for a 49 3 per cent stake in Acorn

continued on page 4▶

JACK TRAMIEL TALKS -P5

British Telecom opts for play-by-modem games

MUD, the multi-user play-by-modem adventure game, currently running on the Compunet network for Commodore 64 owners, may become available to a wider audiance through British Telecom

A new company, MUSE



Simon Dally (left) and Richard Bartle of MUSE

set up by Simon Dally of Century Communications and Richard Bartle and Roy Trubshaw who wrote MUD – to licence the system are currently involved in negotiations with British Telecom

A BT spokesman admitted that the company was looking at MUD, but claimed that it was "too early to call it

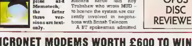
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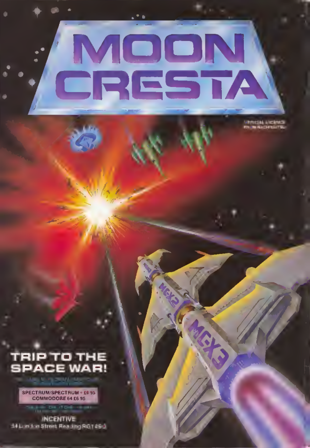
JUST a few of the 240 or so illustrations from Level 9's new adventure, *Emerald Isle*

The program is available for £6 95 for the Spectrum, Commodore 64, Amstrad, BBC, MSX, Atari, Enterprise and Memotech, the latter three versions are text-only.



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Vol 4 No 9

POPULAR Computing WEEKLY

View

Acorn's virtual takeover by the Italian office systems manufacturer Olivetti is obviously a bitter blow for the British home computer industry

Early indications are that the 'new' Acorn will back off from much further involvement in the low-cost consumer market and a reduced level of support for the Electron seems, unfortunately, now likely

In the beginning there was Sinclair with its ZX80 and the fatality rate among would-be competitors has been high – Dragon, Oric, Jupiter, Campputers.

Buying a micro has always been a risky business. Will the micro you buy succeed or fail? Will it get software support? It would be going too far, maybe to say that that gamble is part of the thrill of owning a micro, but it is certainly true that it's the excitement of state-of-the-art high technology that attracts and with that comes all the problems involved with buying in any rapidly advancing area, be it videos, microwave ovens, or whatever.

It isn't surprising, therefore, that quite a high proportion of micro enthusiasts – around a quarter – own more than one micro, and quite a few own three or even four

If Acorn does reduce its support for the Electron, those owners who decide they like computing will in all probability go on to buy a second machine, and then even a third.

Unfortunately for the MSX manufacturers, who would impose a standard on us, micros are still fun partly because they are high-tech gadgets

And people are going to carry on buying them because they are still getting even better, even more powerful, and even more exciting

Presents...

Futures...

Andy Pennell takes a look at Digital Research's GEM operating system used by the Atari ST ... Poker, part 2, on the Amstrad

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56 242 copies sold every week (Jan-June 1984 ABC)

Computer Trade Association Magazine of the Year

MUD spreads

◀ continued from page 1

negotiations."

BT has had a group working on the development of its own multi-user networked game, but they now appear to have been transferred to the MUD project.

According to the BT spokesman, "We are very interested in the idea of multi-user games, but we have to find out if it is technically possible to port the MUD system from the DEC 10 to a new computer."

MUD was originally written on a DEC 10, the same computer as Compunet uses, which meant comparatively little work was needed to set up the compunet system.

Richard Bartle and Roy Trubshaw are however working on a new version of MUD which will be, in Simon Daily's words, "almost machine independent."

"It will run on just about any mini or mainframe in the world," he claims. "All it will need is two months to convert the interpreter for each new machine – the database will be completely machine independent."

MUD Two will also be considerably larger than the version running on Compunet or at Essex University.

It will have more than 900 rooms – over twice as many as at present – and the scenarios will be up-dated regularly. The existing MUD will be kept, as a sub-section of the new game.

Acorn rescue

◀ continued from page 1

Computer.

Chris Curry and Hermann Hauser in turn lose control of the company with their holding reduced from 86.7 per cent to 38.5 per cent (Curry with around 18.4 per cent; Hauser with around 20.1 per cent). Alexander Reid, at present acting chief executive, becomes Chairman and a new group managing director will be recruited externally. Chris Curry and Hermann Hauser become deputy chairman and will concentrate on new product development.

Philips and Drew have replaced Cazenove as brokers for Acorn.

Acorn is also to be split into four divisions dealing with education, science and industry, business and consumer markets. These will be headed up, respectively, by Jim Merriman (former manufacturing director), Jeffrey Tansley (former senior research and development executive), John Horton (former technical director) and Peter O'Keeffe (former sales director).

A further 90 redundancies are also expected at Acorn before the reorganisation is completed.

Sinclair moves to encourage QL mouse

SINCLAIR is apparently interested to encourage a third party hardware company to produce a 'mouse' cursor control device and interface for its QL machine.

The reason for the decision stems from the fact that many of the software titles Sinclair is hoping to release for the QL are program conversions of American packages already available for the Apple Macintosh which require such a 'mouse' device to operate.

The decision represents a turn-round for Sinclair. Earlier this month Sir Clive Sinclair commented that mice and icons were "a gimmick". Mouse-based systems have recently been given a boost with the announcement by Atari of its ST micro.

This Wednesday Sinclair presents a major exhibition to the British trade of forthcoming software and hardware available for the QL.

Among the new programs on show will be the Sinclair *Assembler* package, written by GST, priced at £39.95 and the APL language package from MicroAPL. Companies exhibiting include Metacomco, Psion, Scicon, Triptych, CST, Microperipherals, Quest, PSML, TDI, Eidersoft, Jump, Talent, Sagesoft and Buzz.

Other products for the QL either available or on the way include a 256K memory add-on at £198 from Simplex Data, 432 Greenford Road, Midds. The artificial intelligence language Prolog for the QL is being produced for Sinclair by Experts Systems and will sell for under £100. Up-graded versions of the QL's four built-in software packages which are being supplied free to QLUB members are now available to non-QLUB members from Camberley priced at £15 each or £50 for all four.

● Psion is to produce *Flight Simulation* – the top selling ZX81 and Spectrum title – for the QL scheduled for release in late Spring.

Firebird gets Ultimate C64 options

TWO Ultimate Play the Game titles *Sabre Wulf* and *Underwurlde* are to be converted to the Commodore 64 by Firebird, the British Telecom software house.

A licensing deal has been agreed and Firebird are known to be considering a number of software houses to do the conversion work – Mr Micro is believed to be one possible candidate.

Firebird Publisher James Schoular commented on the deal, "We will be producing programs that will have all the quality of the Ultimate Spectrum originals. We will package them in the same way and sell them for the same price £9.95. Ultimate will oversee the conversion – we wouldn't release anything that didn't match the quality of the originals."

The move – seen as suprising given Ultimate's enviable in-house programming skills – was explained by Ultimate director Tim Stamper, "Our expertise is really directed towards the development of original projects."

Release date for the Commodore versions is not yet fixed.

● *Staff of Karnath* – Ultimate's Commodore 64 3D game – is the first of a series of four and the next will be titled *Entombed*. Ultimate is also considering making conversions of some of its Spectrum titles for the Amstrad. Said Tim Stamper, "We like the Amstrad and there's really quite a lot we can do with it, whereas there isn't a lot more we can do on the Spectrum."

Underwurlde

"My God! Jack Tramiel's got us surrounded!"

Spectrum and C64 packs

BEAU-JOLLY has released two compilation packs for the Spectrum and the Commodore 64, each priced at £19.95 and each with ten titles.

The tapes are as follows. *Spectrum Megahits*: *3D Star Strike* (Realtime), *Blue Thunder* and *Fall Guy* (Elite), *Son of Blagger* (Alligata), *Automania* (Micro-Gen), *Booga-Boo* (Quicksilva), *Psytron* (Beyond), *Wheelie* (Microsphere), *Blade Alley* (PSS) and *Penetrator* (Melbourne House).

Commodore 64 Megahits: *Arabian Knights* and *Trollie Wallie* (Interceptor), *Poster Paster* and *Super Pipeline* (Taskset), *Psytron* (Beyond), *Son of Blagger* (Alligata), *Automania* (Mikro-Gen), *Ghouls* (Micropower), and *Booga-Boo* (Quicksilva).

More News - P10

Travelling Tramiel

*Jack Tramiel talks about his new Atari ST computer to **David Kelly***

Jack Tramiel, head of Atari 'world-wide', flew into the UK ten days ago to answer his critics and to repeat that he still intends to stick to his Spring delivery schedules for Atari's exciting new ST machines.

Sinclair, for example, has recently commented: "Atari doesn't have a computer – it has a box. CES was classical Jack Tramiel super-hype." Tramiel retorts with a slight smile: "Only time will tell if the machine is a figment of our imagination or not."

Atari now plans three versions of its ST 68000-based computer offering 128K, 256K and 512K Ram.

The prices to which Atari UK is currently working are £400, £500 and £600 for the three models. First deliveries to the UK are planned before mid-May and Tramiel says he will manufacture between 100,000 and 200,000 machines in the first three months.

Tramiel is in fighting form. Warner Communications from which he bought the troubled Atari last June has recently agreed to write off a $240m debt owed by the company. Further, he has postponed attempts to raise $150m to fund Atari saying he intends to continue operating on credit from his major component suppliers and manufacturers.

At the moment the ST machine is in its final pre-production stages before assembly begins in March in Taiwan. The one pre-production model in the UK at the moment has Digital Research's GEM operating system implementation for the 68000 completed with only one or two last minute bugs to be sorted out, the final version of the disc operating system was finished by the machine's 20-strong development team two weeks ago.

Jack Tramiel aims his new computer at the serious home user. "We are not selling to the business market – I am selling a personal computer to individuals and I'm not competing directly with IBM."

Even so the specification and pricing of the new ST are ambitious. Its huge Rom contains Digital Research's Gem operating system (50K) incorporating an icon-based working environment with windowing, pop-up menus and control via the ST's external 'mouse' screen handling controller. Also in the Rom is *GEM Desktop* (128K) including wordprocessing, file handling, calculator and a real-time clock, the machine's internal operating system TOS (around 30K), floppy disc controller for the ST's 3½ inch disc option, a version of *Breakout* the classic Atari game, and a choice of either Basic or Logo as the resident language. The Basic is the well-known Personal Basic developed by Metacomco for Digital (also available for the IBM compatible machines). The Logo is Digital's DR Logo.

On the hardware side the ST has a built-in hard disc interface, Midi music interface, twin-joystick ports (one for the mouse), serial port, and TV, composite video, RGB and high resolution monitor outputs.

Being 68000-based the ST's most obvious comparisons are with the Sinclair QL and the Apple Macintosh.

Atari believes it can open up a completely new market with the ST, aiming at people who might have gone for a QL or an Apple – and the company hopes the ST's combination of price and features will prove irresistible. One option that Atari UK is likely to offer is a 620ST machine (the 512K version) in a pack together with a monitor and disc drive – all for less than £1000.

"The QL's not a competitor – it is not a very successful product – I don't think Sinclair is in the same league as far as volume goes as Atari," says Tramiel. "The rival we have is Apple.

"The 68000 has the speed and capabilities to run the windowing and so on and we wanted a computer that anybody could operate – through a mouse. We have been working with Digital Research from the day I started at Atari – even before I took over we were working on the ST.

"When I worked with Digital and looked at GEM I felt it was good or better than the Apple windowing on the Mac." Yet it takes up only 50K and on the ST it will be in Rom.

How about Commodore with its CP/M compatible C128? Is that competition? Tramiel shrugs. "No – the C128 is an 8-bit product. There is no comparison – ours is a 16/32-bit machine. "Listen, I'm working with Digital Research and they invented CP/M – yet I didn't choose CP/M for my machine.

"People want to buy new software – not something 5-10 years old." He smiles. "There's this thing called MSX – they have CP/M – and I don't see them being very successful.

"I'm amazed at Commodore, now I'm out. Why do they have to go backwards!" He sees his other new computer the 130XE – a 128K development of Atari's established 8-bit 800XL machine – as being more of a competitor for the Commodore C128. Atari UK is planning a price of around £169 for the 130XE compared with the suggested price of Commodore's albeit twin processor machine of £299.

The 130XE is expected to be launched in March and, meanwhile Atari has also further cut the price of its 800XL in the UK bundling it with software either with a cassette recorder for £129.95 or a disc drive at £249.95. The repackaged 800XL – the new 65XE is expected to sell in the UK for £99.

It is the ST, though, that is now taking most of Tramiel's attention. "Most people currently doing Mac software are now working for us. So far we have signed up 120 software houses in the US to write for the ST." A GEM semina held for US software houses last month attracted representatives from over 200 companies.

"When the ST is launched officially in Europe at the Hanover Fair next month, Atari plans to have between 25 and 30 pieces of software on sale" he says. "The emphasis will be on disc rather than Rom software and none of the packages planned will be priced over £49."

After that Tramiel plans a range of hardware add-ons for the machine including a laser disc storage system, a modem and communications package, and an add-on music keyboard and synthesiser.



Does he not feel that Atari will find the going tough with the present uncertainty in the UK market – the problems at Acorn and the failure of Oric – not to mention the current renewed home computer price war?

"The beginning of the year didn't look too good but as soon as some of this excess inventory held by manufacturers is flushed out by the present price cutting, I think the industry is going to be very strong by the end of the year.

"By 1986 we will have captured 25 per cent of the UK home computer market."

What of the future – after the ST? "Every time I'm developing a new product line – a new addition to my family – I get completely involved in it.

"But I'm going to have more kids! At the moment we are working on an Atari QL – a quantum leap over the ST. All I can tell you is its internal code name – VIB."

And that's as much as he would say. Tramiel doesn't like to say too much.

Showtime at LET

Trade shows are funny things You won't hear software houses talk about 'games', it's all about 'product', or if it costs over a tenner, 'quality product'. Sales Managers chat about their 'turnover' in 'units', Marketing Managers worry about their 'company profile', and if you ditin't know that home computer software was an act of business rather than love then you would have left LET'85 a sadder but wiser person

Nevertheless, Olympia 2 was the place to be last week if you wanted to catch up on the gossip and see the new software planned for release over the next few months plenty of it there is too

Activision, flushed with success after their, Christmas hit with Ghostbusters announced no less than eight programs "We aim to be the country's leading home computer software company in 1985," says Geoff Heath, their UK Managing Director, and with releases planned for Spectrum, Amstrad and MSX machines – together with their more traditional Commodore 64 market – he may be right *Master of the Lamps* looked very impressive. A colourful arcade/puzzle type game, set in a Sinbad/Ali Baba style, you fly a magic carpet through corridors in space, then landing to solve colour and sound puzzles. Well worth a look on the 64 at £10 99 and soon for the CPC 464 and MSX machines

Games that are mixtures of Arcade and Adventure/Puzzle solving were certainly very much in evidence. Gargoyle Games had a demo of their *Tir Na Nog* follow-up *Dun Darach* up and running – looking equally impressive – with the release date set for May, weighing in at £9 95 for Spectrum and Amstrad versions

Commodore owners will be pleased to learn that they will be able to join Spectrum owners in *Tir Na Nog* from March 4th, again at £9 95

Over at the Hewson stand, the *Avalon* follow-up, *Dragontorc of Avalon*, was being shown. This time Maroc travels up and down the realm on ley lines to defeat Morag the Shape-shifter Put your £7 95 away for the moment though, as it's not available until March 28th. Available slightly earlier around mid-March will be CRL's *Rocky Horror Picture Show* (£8 95 for the Spectrum) on show for the first time, and creating a suitably Gothic atmosphere

You won't be able to get your hands on Palace's *Cauldron* until April or May, but it looks like it will be worth the wait for Commodore 64 owners at £7 99

Overall, QL software was pretty thin on the ground, although C16 owners look like their luck might just be in, with many software houses planning the occasional release Bubble Bus and Electric Software were doing their bit for endangered species by showing the odd game for MSX and Einstein machines Latest in the line of movie tie-ins ... Ocean's *Never Ending Story* and Adventure International's *Gremlins* – the latter coming in two forms, a pure text and text-plus-arcade versions. And talking of sign-ups, the latest celebrities to follow in Daley Thompson's and Eddie Kidd's well worn path – Brian Jacks and Jackie Charlton? Expect sport orientated offerings soon

Things seemed to be looking up at Virgin, with the excellent Amstrad *Sorcery* and the show confirmed this. What particularly caught my eye was a program in development at the moment under the working title of *White Knight* Set in a dream world of fantasy, the 3D graphics on the Commodore were excellent – as they were on *Gyron*, the soon to be released Firebird game on the Spectrum. Also on the Firebird stand – gasp – *Elite* on the 64. Have your £14 95 ready by early April

Finally, there were a lot of foreign buyers at the show this time ... so what kind of impression did they get of 'The British' from the Mikro-Gen stand where Wally and his gang were promoting their new game and hit (let's hope not) *Everyone's a Wally* (£9 95, Spectrum)? It probably confirmed their suspicions that the British are very good at three things – making tea, writing computer software ... and making themselves look very silly indeed

John Cook



Something to celebrate!
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A must for every would-be astronomer. Discover the key stars, nebulae and galaxies of the Northern Skies
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A unique, multi-feature quiz game for one or two players. Ten huge quiz files provided – or make your own. Superb graphics
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THE BEST


Your journey commences in the village


but soon thirst leads you to an Inn


where you may be able to get useful information

* Castle of Terror voted No. 1 Adventure game by Commodore User, March 1985.

THE BEST ADVENTURES

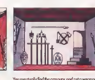
1. CASTLE OF TERROR
2. ~~Colossal Adventure~~
3. Zork III
4. Eureka
5. ~~Saga of Eric the Viking~~
6. THE HOBBIT
7. CLASSIC ADVENTURE
8. ~~Return to Eden~~
9. ~~Spiderman~~
10. SHERLOCK

Commodore User had this to say about CASTLE OF TERROR.

"The programmers all deserve credit for devising a fresh and entrancing variation, and for graphics in terms of their details, colour, clever animated elements and speed. The music adds measurably to the atmosphere all the way through — and makes me extremely envious of what some programmers manage to coax".

CASTLE OF TERROR is available for your Commodore 64 at £9.95 from the publishers of THE HOBBIT, CLASSIC ADVENTURE and SHERLOCK.


At last you find the Castle


and with great trepidation, enter through the drawbridge

but you valiantly search on through the Castle

You eventually find the armoury, and get a weapon


Will you ever manage to rescue the maiden?

CASTLE OF TERROR

ADVENTURE*

You set off for the Castle

past the cemetery where a new grave is being dug.

Can you find your way across the river?

The entrance hall is guarded by knights

but you manage to get past to the banquet hall

As you wander you see you were not the first ...

to support you as you wander the corridors.

TITLE	SPEC'M	CBM 64	BBC ELEC'N	AMST'D	CBM 16
Castle of Terror		●			
Sherlock	●	●			
Hampstead	●	●			
Classic Adventure	●	●	●		●
Hobbit	●	●	●	●	
Zim Sala Bim		●			
Grand Larceny		●			
Mugsy	●	●			

by MELBOURNE HOUSE

Cut price BBC B's

RUMBELOWS the high street electrical chain has been selling the BBC B with cassette recorder and software for £299

The move described as "temporary" by marketing director Peter Jackson was made to clear unsold pre-Christmas stocks of the machine of around 1,500

Mr Jackson stressed that the price reduction was not a permanent feature and that Rumbelows had no intention of dropping the BBC. "It was simply a matter of clearing a batch that wasn't sold at Christmas as part of a general sale. Now that Acorn has resolved many of its problems and consumer confidence is returning we are confident of continuing sales of the machine."

A new Rumbelows price for the machine has not yet been fixed

C64 printer interface

THE ZERO parallel interface cable connects a Commodore home computer to any Centronics standard printer

The price of £42.95 makes it one of the cheapest available as it does not require any driving software to be loaded before use. Equally it does not use any computer memory

All special printer functions like special ASCII control codes are accommodated. A 16K printer buffer is available for use with the system and costs £13.95.

More details from Zero Electronics, 149 King Street, Great Yarmouth. 0493 842023

Bug-Byte in QS tie-up

QUICKSILVA has announced the acquisition of exclusive rights to seven new games developed by Bug-Byte

Titles are thought to include *Automan* and *Turmoil*

Said Quicksilva MD Rod Cousens "One of Quicksilva's functions in the future will be to act as a publisher of third party software"

Despite the deal Bug-Byte intends also to continue to produce programs under its own name. Bug-Byte director Tony Baden explained, "It's no experiment, not necessarily the way we are going."

Anti-pirate invention

MAPSOFT – a subsidiary of the Southend-based electronic supplies company Maplin – has announced a 'revolutionary anti-piracy software system' called Safe Load

The company claims the system invented by Keith Halliwell, will prevent pirate tape-to-tape copies from running on a home computer, hence preventing the school-yard copying that software houses claim robs them of so many sales

Safe Load works by combining specially made data cassettes with related machine-code within the program itself. "The cassettes will work on any tape player," explained Maplin co-founder Roger Allen "but there are slight mechanical differences. Software on the tape looks to see if you've got the right hardware – if you're not using a Safe Load cassette the main program won't run."

Said Ian Andrew of Incentive Software – whose fast-loader has been incorporated into Spectrum and Commodore 64 versions of Safe Load, "It can only help – now if kids want a program badly enough, they'll have to buy it." Details from Maplin on 0702 554155

Correction: Figures for Commodore's worldwide financial results given in last weeks Page 1 story were given in $1,000's.

Shape of things to come

*With the advent of advanced home machines like Atari's ST, **Boris Allen** looks at the impact of the Icon/mouse/windows philosophy*

At one time the computer was dominant. Be the machine an Atlas or a Spectrum, it was the name that counted and the machine sold on its own specific hardware features.

In the late 1970s a new breed of machines developed which were neither expensive nor aimed at the home user; these were serious computers aimed at serious users. A large number of these serious machines used the same standard operating system – CP/M – so that, in theory, the software base was not tied to a specific make of micro.

The CP/M operating system developed by Digital Research allowed disc software in the CP/M format to be run equally well on any CP/M compatible machine. The snag with CP/M was that it only worked on systems based around the Intel 8080/8085 and Z80 microprocessors. The Z80 is the chip used in many home microcomputers, but apart from exceptions such as the Amstrad CPC464, the new revamped Lynx or even Commodore's new horse-designed-by-a-committee, the C128, not many offer CP/M.

As the home market begins to move away from the action of the games computer towards a machine which is more flexible and powerful, then the need for a larger and more worthwhile reservoir of software becomes pressing.

In the higher reaches of the micro market, the IBM PC has produced (via the MSDOS disc standard system) a wider variety of software than has previously existed, apart from that available under CP/M.

What relevance has this, however, for the 'ordinary' user of computers at home? The relevance comes from the gradual move of computers towards 16-bit microprocessors. One important characteristic of such chips is the extra speed which they can give to applications (though this is not always the case, for example the QL). In the long term this is less important than the increase in the memory available to such microprocessors. With the newer chips such as the Motorola 68010/68020 or the Intel 186/286, the amount of memory that can be accessed is in the region of nearly 1 Gigabyte.

Even with the more mundane of the newer chips such as the Motorola 68000 or the Intel 8086, the memory available is orders of magnitude greater than the 64K accessible by the now aged 6502 (C64, BBC and Oric) and Z80 (Spectrum, Amstrad) chips.

One reason why Sinclair Research stopped selling the 16K Spectrum, or Acorn stopped the Model A, is memory. Think for a moment of games which can run on a 16K Spectrum, and compare them to games which can only run on a 48K Spectrum, to see how the extra memory can be beneficial.

As another comparison, compare *Elite* on the BBC computer with *Elite* on the same machine, but with discs. The addition of fast reliable disc storage increases the memory available to a program, because information can be stored on disc, and then retrieved as required.

The friendlier and easier to use an environment is, the greater the necessary software investment.

It was this realization – richness requires memory – that spurred some researchers in the early 1970s to try to produce sophisticated, easy to use, powerful software environments for the non-expert user. Based at the Palo Alto Research Center of the Xerox Corporation (Xerox PARC) this team decided that the whole approach to computer use needed rethinking.

The upshot of this rethink is a language – Smalltalk – about which much has been heard but little is known, an input device – the now fashionable mouse, and a mode of presenting information in graphic form – the icon. Despite all views to the contrary, mice and icons did *not* begin with the Apple Lisa or Macintosh. Xerox is to blame!

Now Digital Research, the originators of CP/M, have decided that they want to encourage the new and future users of computers to be less loyal to the make of the computer, but instead become committed to a software environment.

The environment derived from the original Smalltalk Xerox thinking is GEM (Graphics Environment Manager) and it is aimed at the providers of software, so that these ISVs (independent software vendors) can be assisted in the production of easy to use software.

GEM is being sold by Digital Research as an OEM (original equipment manufacturer) product, which means that the manufacturer (or some other company) puts GEM on their computer, not the user or the ISV. When you read that Atari is to put GEM on their new ST series of computers this means that Atari have arranged to implement the system on their computer.

GEM is not a language, such as Basic, but it is a system – an environment in which to run software.

The important characteristic of GEM is that, once a package has been written in GEM, that package can be easily produced to run on any computer which offers the GEM environment. This portability is due not to GEM itself, but to the languages used to produce the application. For example, a database package is likely to use GEM to handle how the user converses with the machine but the accessing of the database will have to be programmed in some language (probably C). Any problems are likely to occur in the compatibility of different C compilers.

The requirements for GEM are a 16- or 32-bit system with a large memory (128K or better) and a reliable disc storage facility.

The most important consequence of extreme flexibility it offers for the user is that the machine becomes less important than the software. Since the same package will run on many machines, you will no longer have to buy an *X* computer to use the *Z* program. Instead you will be able to buy the machine which gives the best value for money. If you like, very much like the concept behind MSX – but state-of-the-art and with far greater potential and flexibility.

The implementation of such an icon-based open operating environment on computers – and there seem to be an increasing number of such implementations including Atari, Acorn and IBM – implies that we will be less concerned in the future with unfriendly machine-specific software and more concerned with the quality of the computer. The pressure will be on the manufacturers to produce the goods. If a firm promises a super computer, place your orders now for delivery within 28 days, there is even more reason to wait for it to appear.

GEM, and similar products from the Xerox philosophy such as Microsoft Windows, are attempts to make software more important than the machine.

Next week: Andrew Pennell reviews the Digital Research GEM operating system.

Supremacy

Program *Spy vs Spy* **Price** £9.95 **Micro** Commodore 64 **Supplier** Beyond, Competition House, Farndon Road, Market Harborough LE16 9NR

Spy vs Spy covers the antics of two secret agents – the black spy and the white spy. They were created by Antonio Prohias and their adventures as they battle for supremacy over each other first appeared in *Mad* magazine in 1960. Beyond have now launched *Spy vs Spy* as an animated cartoon adventure. The game can be played by two people – one seeking to outwit the other – or one player against a computer controlled agent.

The ultimate objective of the game is to escape from the embassy with a top-secret briefcase, passport, money, secret plans and a key.

The novelty of the game is that the screen is split into two. Activities of the black spy can be seen in the bottom half of the screen and the white spy's progress can be viewed in the top window. Both players move simultaneously, so they can engage in hand-to-hand combat.

All the action is shown in gripping 3-D detail. As you travel through the different rooms and floors of the embassy, it's possible to catch out your opponent with a few well-placed booby traps.

The features that make *Spy vs Spy* particularly good are the zany humour and the amazing cartoon-like graphics. At the end of each game you get a rating. Lots of action, but no real violence. A fun game.

Tom Hussey

Promise

Program *Nightmare Hall* **Price** £5.95 **Micro** BBC B **Supplier** Asterios Software, Kinross, Kendal Avenue, Epping, Essex CM16 4PP

Jeff Thompson and Asterios are obviously going to be names to look out for.

On the evidence of this game there are going to be some fine adventures coming from them in the next couple of years.

Nightmare Hall may not be a great text adventure but shows intriguing promise. First the preliminary section gives you heaps of information, hints and ideas where they belong – on screen. There's even a help section on the reverse of the tape. The game itself displays two lines of description and a note of any objects or creatures around.

It might have been more interesting if the descriptions had been longer and the chart briefer – the nightmare is a bit short on atmosphere.

Your task is to find some treasure and the deeds to an old mansion. There are the usual problems and some naughty tricks.

Enough good touches and well designed features go to make *Nightmare Hall* just worth buying.

Dave and Jan Watterson

Energy

Program *Survivor* **Micro** Amstrad **Price** £6.95 **Supplier** Anirog Software Ltd, 8 High Street, Horley, Surrey

"Is Angus the SURVIVOR!" it proclaims on the cassette inlay with a proud defiance of the rules of punctuation. The answer is that I don't know.

Survivor is a strange collection of bits and pieces that are reminiscent of some marvellous existing games rolled together into a package that is somehow a bit less than all of them. In particular the 1008 rooms, which all look much the same as each other, together with the materialising nasties and the fact that you can always shoot sideways at them around various obstacles is like Psytraxx on the Spectrum. The setting, the haunted Deadstone Abbey, and the fact that the various exits keep shutting and opening remind me of *Atic Atac*. Unfortunately, *Survivor* lacks the strategy or 'adventure' aspects of both, with no mysterious objects to collect that may, or may not, be useful later. The graphics are also nowhere near as humorous or as rich in detail as *Atic Atac* although some of the monsters are easily as vicious as anything I've seen on a game since *Maziacs* and the music is very bouncy.

Really it's not a bad game, not brilliant but at least it will keep its playability for a reasonable length of time. Basically you are hunting for 'bombs', treasure, bullets with which to shoot the pursuing ghosts and elixir to restore your draining energy. The only real flaw is that you get damaged by the monsters when they are still a fairly long way away. The blurb suggests that this is deliberate and that the ghosts explode when they get near, but in practice it is annoying and the suspicion arises that it is a justification for a bit of loose programming.

Tony Kendle

Time Limit

Program *Quizzmer* **Price** £5.95 **Micro** Spectrum 48K **Supplier** Macmillan Software, Macmillan Publishers Limited, 4 Little Essex Street, London WC2R 3LF

Earliest type of educational program – _U__Z? *Quiz*. That's right. Recently though computer quizzes have become more sophisticated and *Quizzmer* demonstrates many recent innovations while adding a few.

Choice – _P___ON_? Yes, there are many *options*, from single or two player games to loading one of ten question categories included to creating your own. Difficulty is controlled by choosing a time limit of 15, 30 or 60 seconds, ten correct answers completes a game and points are scored for speed.

Primitive educational swinger – _H_NG_A_? Which means our old friend *Hangman* is back but in a neat variation. One option draws a miniature picture, bit by bit, for every right answer, and as these are often amusingly animated they provide a small reward. The inclusion of a few letters provides clues and the annoying feature of repeating questions seems to have been banished.

Reviewers comment – C__I___C___MS? Inevitably there are criticisms, despite the friendly menus and wide choice. Keyboard response seemed a little slow and the final recap of 'words to remember' (ie, those you got wrong) would be more useful if definitions were repeated too. However, the main problem seems to be an uncertainty over what level the combination of quite difficult questions and unspectacular quiz is aimed at. Rather W__ET__Y but D__LL.

Jake Minson

Reviews

Commands

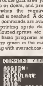
Program *Character and Sprite Editor* **Price** £12.95 **Micro** Commodore 64 **Supplier** Duckworth/Bug Software, The Old Piano Factory, 43 Gloucester Crescent, London NW1 7DY

Many Sprite editors have been produced for the Commodore 64, but this program must rate as one of the best

Sometimes, the instructions for these sorts of programs seem to be written in a type of secret code, but this utility comes with a clear fairly easy to understand booklet

I shan't bother to explain the two programs separately because they both have roughly the same facilities You can design and store up to 64 characters or 32 sprites.

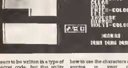
The thing I particularly like about the utility is the way in which the joystick can be used for easy access to the editor's commands No more messing about with those nasty Commodore cursor keys. All you have to do is shift the joystick to the control list on the right of the grid area Just scroll up or down, and press *return* when the required command is reached A dozen or so commands are available – printing sprite data, multi-coloured sprites etc



Small basic programs and *pokes* are given in the manual, along with instructions on how to use the characters and sprites in your own programs

A very well thought out package (especially the screen display) If you need a sprite editor, look no further

Tom Hussey



Polluted

Program *Seaside Special* **Micro** Commodore 64 **Price** £6.90 **Supplier** Taskset, 13 High Street Bridlington, YO15 4PR

Whenever someone mentions a Taskset game, I think of slick graphics and great effects as in their program *Super Pipeline Seaside Special* retains both those qualities – you might even be able to guess what tune plays throughout the action

The polytikians (otherwise known as politicians) have come from their planet in order to process their deadly nuclear material on Earth Unfortunately for them, they decided to pollute our hero's favourite beach with nuclear waste

Of course, you take the role of Bodney when he decides that the only way to stop the meanie polytikians is to bombard them with radio-active seaweed One night, he decides to creep down to the seashore and gather enough seaweed to cart to Downing Street He then goes straight to No 10 where various polytikians can be seen at the windows He then fires the seaweed in a vain attempt to kill them. After a few polytikians have been killed, you get a chance at Maggie herself, but believe me she doesn't hang around for long

Seaside Special is a bit zany but it is fast-moving and exciting It is very easy to recognise all the polytikians, so if you feel a bit frustrated with the Government's policies, then why not have a bash at this little game?

Tom Hussey

Disassemble

Program *Mon QL* **Price** £19.95 **Micro** QL **Supplier** Hisoft 180 High Street North, Dunstable Beds LU6 1AT

As any QL owner will know, there are a large number of QL assemblers available for the QL and even some disassemblers but no machine code monitors or debuggers. Well, this has all changed now as such a program has been launched by Hisoft. When loaded it takes up around 12K of memory and may be placed into the top or bottom of the memory

When loaded the program adds a number of new commands to Basic The main one of which *MonQL* calls the program The other commands are *MonExec* and *MONEXEC W* which allow you to monitor a job and a fully working version of the *Call* command

After calling the program you are able to disassemble, find, modify and single step machine code instructions While you are doing this, the display produced shows the value of the cpu's registers, the bytes at this location and a disassembly of these bytes

The 12-page manual supplied with the program is well set out giving information on each command and how the program may be used Like all of Hisoft's products, this is of the highest quality and I have had no problems while using it.

Roger Thomas

Light Life

Program *The Joffe Plan* **Price** £9.95 **Micro** Spectrum 48K **Supplier** Mirrorsoft, Mirror Group Newspapers, Holborn Circus, London EC1 1DQ

The fad for diets in the past few years bears out suspicions that weight problems are the curse of an affluent society F-Plan, High Fibre and here, Professor Justin M Joffe's contribution to the West's weighty obsession

Where *The Joffe Plan* differs from primitive predecessors is in its view of the dieter as a whole person

Initially the dieter answers a series of questions about eating and activity habits before a target weight is produced, this is never too low because crash dieting doesn't work, according to Joffe The second side of the tape contains the 'meat' of the plan, the dieter reports in, daily if possible and ways to keep on target are suggested.

Back-up consists of two booklets which explain Joffe's theory of successful slimming, and if their style seems overly American at times it's hardly surprising – Professor Joffe is a US based behavioural psychologist. His methods seem sensible though and the computer makes a positive contribution.

John Minson

```
THE JOFFE PLAN

Your Weight          12st 1lb
Target Weight        11st 3lb
Rate of Loss         0.5 lb
(per week)
Target Date          02/08/85

Do you want to change
any of these figures?
```

Disc discovery

Hardware *Opus Discovery Disc System* **Price** £199.95 (Discovery 1); £139.95 (addditional drive for Discovery 1), £329.95 (Discovery 2); £9.95 (printer lead) **Micro** Spectrum **Supplier** Branches of Boots or Opus Supplies, 158 Camberwell Road, London SE5 0EE 01-701 8668

Opus has joined an increasing number of manufacturers producing a disc system for the Spectrum/Spectrum Plus

At the last count there were seven different systems, with six currently available, and another due to be launched in April

With such a wide choice Opus has had to make its system something special and in this it has been largely successful

It is completely Basic compatible and, in addition, commands have been added to include random access files, simplify the syntax, reduce the memory used and give the option to use part of the Spectrum's memory as a Ram disc

All previous disc options for the Spectrum have suffered from the drawback that none of them have been supported by the High Street heavies or, to any great extent, the software houses

The Discovery range as it will be known is different – it is to be sold through Boots and they have commissioned six software houses to produce programs for it If that were not enough Memorex, the disc manufacturers, are also supporting it and will be giving two free discs and money-off vouchers with every system In short, the Opus system is part way to setting the disc format standard for the Spectrum

The hardware itself is quite sensible The unit bristles with connectors A bi-directional parallel port to drive a Centronics printer, a joystick port, Kempston compatability, a composite video output for a monitor and a through port should you want to add anything else

The whole thing, including the drive(s), is housed in a hefty metal box, the same width as the Spectrum and roughly square, in matching black livery

Discovery 1 – the basic version of the system – uses a single, 3½ inch 40 track drive giving a formatted capacity of 178K, with the option to add a second drive later

Discovery 2, as you would expect, is a twin-drive model This is the maximum number the system can handle but you could 'mix and match' different sizes and capacities

Getting the system working is relatively easy The unit has a platform on the front and the Spectrum sits on this and simply slides into place As with Interface One a screw passes through the platform to secure it Unlike Interface One however the casing obscures all the sockets on the back of the Spectrum.

The aerial lead has a cut-out to accommodate it and power is derived from the unit so these are not a problem, but it is very difficult to fit the Sinclair cassette leads As you will need these if you want tape-based software a flexible connector is useful to give you working room All full size keyboards will fit but the Transform is a little tight A Spectrum or Spectrum + with Interface 1 fitted cannot be connected to the Discovery system

Once working the system behaves just like a Microdrive All the usual commands can be used from Basic so most programs written for Microdrive will run without modification. For example *Tas-Merge*, the Picturesque *Assembler* and *White Lightning* worked first time. Only programs which use hook codes, such as *Devpac*, will not.

Luckily, you are not limited to the normal (horrendous) Microdrive syntax, unless specified the "m" channel is taken as the default and can be omitted The only differences are that *Merge* will not auto-run, *Save* automatically overwrites an existing file of the same name and, when using channels *Inkey$#* returns a nul string when it reaches the end of the file Files can be renamed whilst being *Moved* and a special *Move* is used to make a complete back-up

All the other additions relate to the way the unit handles channels and files In addition to the normal *K S* and *P* channels, *M, t* and *b* are added, as with Interface 1 To this are added *j* to turn the joystick on and off, *d* for the Ram disc (normally the upper 32K) and to move up files on the disc, *Cat* to access the directory as a file and *Code* for direct memory transfer Hash (#) allows you to link two channels together Twin drive systems contain some Ram and so do not use up any memory – on a single drive system roughly 300 bytes are taken per open stream

For filing, ingenious use has been made of the existing keywords *In* and *Out* can be added when opening a file to denote if it is a read or write file. *Exp* allows you to expand a file, *Rnd* denotes a random access file and *Point* is the position pointer *End of File* can also be detected.

Opus can be congratulated on taking an adequate system and turning it into a very useable one. It may not be the fastest disc system around but it compares well with the Microdrive. Directory access times are much faster but the transfer rate is a little slower

Task		Microdrive time (secs)	Discovery 1 time (secs)
Format		25	17
7K Basic	*Save*	9	6
	Load	14	5
	Erase	15	1
2*32K	*Code*		
	Save	26	41
	Load	16	41
	Erase	30	1
Open file/ *Print* 100 files/*Close* file		10	4
Open file/ *Input* 100 files /*Close* file		10	5

Its biggest bonus is that, at last, a system has software support Software houses have been sitting on the fence for far too long waiting to see which, if any, system will become a standard. Now (hopefully) that situation will change

The initial programs which will be available priced at a somewhat expensive £14.95 per disc, are *Designers Pencil* from Activision, *Mugsy* and *Sports Hero* from Melbourne House, *International ATC* and *Technician Ted* from Hewson Consultants, *Codename Mat*, *Jasper* and *Kentilla* from Micromega and *Mini Office* from Database Publications *Trans Express* from Romantic Robot is to follow

How does the disc system compare with Sinclair's own stringy floppy tape Microdrives? At a little over double the cost for the Opus device I guess you pays your money and you takes your choice

John Lambert

FISH FOR IDEAS AND NET A MODEM

Micronet is a huge computer database of news, reviews, advice and comment on everything to do with computers including machines, games, adventures, networks, gossip, technical tips, charts, show previews and anything else as a micro owner you might want. It's also a database you can take part in, send messages, join in late night 'live' debates and play computer wargames like *Starnet* against dozens of other players

The Competition – worth over £600

This week *Popular Computing Weekly* is offering the chance to win everything you need to link into Micronet – all you have to do is design a new section for the system.

The Prizes

Five in all. The outright winner will receive a modem suitable for their micro, all necessary software and 12 months free subscription to Micronet.

Four runners up will each receive modems, software and four months subscription to Micronet.

Entrants should note that modems are at present only available for the Spectrum, Commodore 64 and BBC

What you have to do

Below is a list of Micronet features, there are games, letters pages, information, specialist information areas, etc – study them carefully

We want you to think of a new area for Micronet to cover, a new topic that isn't already covered but would be of interest to Micronet users. Your idea should be carefully considered – is it something it would be possible to write new things about regularly? Remember, Micronet is frequently updated and people won't keep looking at a page that rarely says anything new

What we want is your idea for a new subject to be included on Micronet with full details about the kind of things it might include, how it might be sub-divided and so on. The winning idea will be both original and practical – in fact if it's original and practical enough it may even be turned into a regular Micronet feature.

Where to send your entries

First of all collect the tokens to be printed this and in the next two weeks – three in all – and send them with your idea and full explanation to Micronet competition, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP. Closing date for the competition is 25th March



Micronet Features

1) **Electronic Mail** – sending messages from your micro to another user
2) **Contact** – Micronet's bulletin board with a computing adventure and personal contact group
3) **Chatline** – holding live discussions from your keyboard with other subscribers
4) **Swapshop** – a way of swapping or selling anything – type your advert in directly to the screen.
5) **Talkback** – write to Micronet and see your letter on the tv
6) **Newsflashes** – computer news and gossip
7) **Microbases** – three areas dedicated to information for the BBC, Spectrum and Commodore 64.
8) **Headstart** – an educational database with help sections, telesoftware, reviews and talkback.
9) **Technical Help** – Micronet technical help desk.
10) **Musicnet** – news from the music scene with editorial, reviews, competitions and features
11) **Software reviews** – reviews of software both in the shops and on Micronet itself.
12) **Aladdin's Cave** – free programs to down-load from Micronet.
13) **Chargeable Telesoftware** – commercial programs to down load.
14) **Starnet** – Micronet's own galactic warfare game. You play against hundreds of other players scattered all over the country
15) **Events diary** – a 'what's on where' guide of current computer events.
16) **Micromouse** – the alternative database to Micronet's news area. A gossip column of communication news.
17) **Infobeeb** – a special area for BBC users to swap ideas and information
18) **Midnight Micronetters** – an on-line social club for Micronet members after midnight.
19) **SUTUG** – Sinclair User-to-user group & special group for Spectrum users to meet and keep in touch with each other
20) **Directory** – a full listing of all Micronet numbers plus their mailbox number

Coupon 1

Here is my entry for the Popular Micronet competition. I include three coupons.

Name ....

Address ....

....

....



MSX
SPANISH PUNKS RULE OLE!
APATHY
The writing's on the wall...
The introduction of MSX Basic has quite simply revolutionized the use of home computers. From today most of the languages in common use will fade into the brickwork.
Up until now home computers have used different machine languages so that games and peripherals have been totally incompatible, but the introduction of MSX Basic will allow all products to run on any of these new machines The implications are awesome
Such a milestone in computer development deserves an equally innovative book. And not surprisingly it's published by Penguin
MSX BASIC REVEALED gives the reader vital programming skills for MSX, and a detailed examination of its potential uses. It is one of the first books in the field and is certainly the very best.
When you realise that present day language systems have had their chips you'll realise the need for MSX BASIC REVEALED
by Robert Palmer and Ian Richards £6 95
MSX BASIC REVEALED
Robert Palmer and Ian Richards
UNBEATABLE VALUE
ibico LTR-1 LETTER QUALITY PRINTER
£175 inc.VAT
A compact (12" x 2½" x 8"), letter quality printer from Ibico with a host of outstanding features at the unbelievable price of £175 00 inc VAT
Plugs straight into most computers, with optional interface available for Commodore 64 and Sinclair Spectrum Compatible with BBC A or B and any computer with parallel interface.
• Prints 12 characters per second Elite type (12 characters per inch) • Bi-directional printing • Logic seeking • Plain paper uses your letterheading • Up to A4 size paper • Instant change ink roller • 96 characters, full UK ASCII code • 80 columns • Separate power switch • On/off pilot lamp
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TEL: 01-568 2379 Telex: 934368
To: Ibico Ltd., 181 Spring Grove Road, Isleworth, Middlesex. Please send Ibico LTR 1 literature and details of Printer cables and interfaces.
Please supply
Ibico LTR 1 letter quality printer £175 00
Printer cable for BBC A or B £9 95
Interface for Commodore 64 £35 95
Interface for Sinclair Spectrum £39 95
I enclose a cheque/PO for £
(Plus £4 50 for postage and packing)
Please debit my Access/Barclaycard Card No
Expiry date
or telephone your credit card order
ALL PRICES INCLUDE VAT
PC
Name
Address
Post Code
Tel No

Four unputdownable books to make your Commodore unswitchoffable

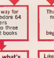
Discover all the Commodore Books that will really help you get the most from your C16, Plus 4 or good old 64... follow the flow to find out the best buys for you and your Commodore...

SUNSHINE

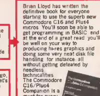
First, what's your computer?

This way for Commodore 64 owners and to three great books

This way for the new C16 and Plus4 and your beginners' guide



Brian Lloyd has written the definitive book for everyone starting to use the superb new Commodore C16 and Plus4 micros. You'll soon be able to get programming in BASIC and at the end of a great read you'll be well on your way to producing hi-res graphics and doing some very neat disk file handling for instance all without getting defeated by needless technicalities. The Commodore C16/Plus4 Companion is a must for every owner and user, and it's only £5 95



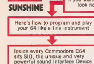
Now, what's your interest?

Like to learn Logo, the language that's beyond mere BASIC?

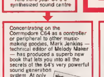
If you want to make music look no further

Here's how to program and play your 64 like a fine instrument

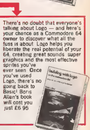
And here your 64's a synthesized sound centre



Inside every Commodore C64 sits SID, the unique and very powerful sound Interface Device. Understand and make good use of SID and you've got a wonderfully musical micro. Ian Waugh's book lets you use SID to the fullest with programs to produce chorus echo, polyphony, even sound effects. Start playing around with your 64, and let it make music for you. The book's only £6 95, too



Concentrating on the Commodore C64 as a controller or peripheral to other music-making goodies, Mark Jenkins — technical editor of Melody Maker — has produced a superb new book that lets you into all the secrets of the 64's very powerful sound generation system. At only £6 95 its novel approach is a must for both musicians and micro enthusiasts



There's no doubt that everyone's talking about Logo — and here's your chance as a Commodore 64 owner to discover what all the fuss is about. Logo helps you liberate the real potential of your 64, creating great sounds, super graphics and the most effective sprites you've ever seen. Once you've used Logo, there's no going back to Basic! Boris Allen's book will cost you just £6 95

All these latest Sunshine Books are available from your local bookshop, from W H Smiths and John Menzies, and also direct by post from Sunshine.

See your bookseller and reserve your copy today, or complete and send this special direct order coupon.

To Sunshine Books
12 13 Little Newport Street London WC2H 7PP

Please send me the following book(s) for the Commodore

_______ copies of the Commodore C16/Plus4 Companion at £5 95 + 60p p&p each

_______ copies of Building with Logo on the Commodore 64 at £6 95 + 60p p&p each

_______ copies of Commodore C64 Music at £6 95 + 60p p&p each

_______ copies of Electronic Music on the Commodore 64 at £6 95 + 60p p&p each

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Poker

Don't lose your shirt in this version of Poker written for the Amstrad CPC 464 by *Terry O'Neil*

This is it You are down to your last £10 with nothing else to lose Looking for a fast buck, your thoughts turn to gambling, so you enter the Last Chance Saloon.

Type in Listing One the loading screen, and save it on as "!Poker" Then type in Listing Two, and save it immediately after List One Rewind the tape, type Run"" and the program should auto-run. Line 165 in List Two uses two control codes, obtained by pressing 'Control' and 'O', then 'Control' and 'A'. The second part of List Two will be published next week.

```
1 CLS
2 MODE 1
3 WINDOW £1,2,7,2,10
4 WINDOW £2 10,15,2,10
5 WINDOW £3,18,23,2,10
6 WINDOW £4,26,31,2,10
7 WINDOW £5,34,39,2,10
8 FOR I=1 TO 5
9 FOR S=1 TO 54
10 READ PAP,PAINT,CAR
11 PAPER £I,PAP:PEN £I,PAINT
12 PRINT £I,CHR$(CAR);
13 NEXT S
14 NEXT I
15 PEN 3:LOCATE 16,12:PRINT CHR$(164); " By Terry O'Ne
ill"
16 PEN 1
17 LOCATE 6,20 PRINT"LOADING . . . . "
18 RUN"
19 REM P
20 DATA 4,4,32,4,4,32,4,4,32,4,4,32,4,4,32,4,4,32
21 DATA 4,4,32,4,3 214,1,1,32,1,1,32,1,1,32,1,1,32
22 DATA 4 4 32,3,3,32,1,1,32,3,3,32,3,3,32,1,1,32
23 DATA 4,4,32,3,3,32,1,1,32 4,4,32,3,3,32,1,1,32
24 DATA 4,4 32,3,3,32,1,1,32,4,4,32,3,3,32,1,1,32
25 DATA 4 4,32,3,3,32,1,1,32,1,1,32,1,1,32,1,1,32
26 DATA 4,4,32,3,3,32,1,1,32,3,3,32,3,3,32,4,3,212
27 DATA 4 4,32,3,3 32,1,1,32,4,4,32,4,4,32,4,4,32
28 DATA 4,4 32,3,3,32,4,3,212,4,4,32,4,4,32,4,4,32
29 REM O
30 DATA 4,4,32,4,4,32,4,4,32,4,4,32,4,4,32,4,4,32
31 DATA 4,4,32,4,3,214,1,1,32,1,1,32,1,1,32,1,1,32
32 DATA 4,4,32,3,3,32,1,1,32,3,3,32,3,3,32,1,1,32
33 DATA 4,4,32,3,3,32,1,1,32 4 4,32,3,3,32,1,1,32
34 DATA 4,4 32,3,3,32,1,1,32,4,4,32,3,3,32,1,1,32
35 DATA 4,4,32,3,3,32,1,1,32,4,4,32,3,3,32,1,1,32
36 DATA 4,4,32,3,3,32,1,1,32,4,4,32,3,3,32,1,1,32
37 DATA 4,4,32,3,3,32,1,1,32,1,1,32,1,1,32,1,1 32
38 DATA 4,4,32,3,3,32,3,3,32,3 3,32,3,3,32,4,3,212
39 REM K
40 DATA 4,4,32,4,4,32,4,4,32,4,4,32,4,4,32,4,4,32
41 DATA 4 4 32 4 3 214,1,1,32,4,4,32,4,3,214,1,1,32
42 DATA 4,4,32,3,3,32,1,1,32,4,4,32,3,1,214,4,1,212
43 DATA 4,4,32,3,3,32,1,1,32,4,1,214,4,1,212,4,4,32
44 DATA 4,4,32,3,3,32,1,1,32,1,1,32,4,4,32,4,4,32
45 DATA 4,4,32,3,3,32,1,1,32,3,1,213,4,1,215,4,4,32
46 DATA 4,4,32,3,3,32,1,1,32,4,3,213,3,1,213,4,1,215
47 DATA 4,4,32,3,3,32,1,1,32,4,4,32,3,3,32,1,1,32
48 DATA 4,4,32,3,3,32,4,3,212,4,4,32,3,3,32,4,3,212
49 REM E
50 DATA 4,4,32,4,4,32,4,4,32,4,4,32,4,4,32,4,4,32
51 DATA 4,4,32,4,3,214,1,1,32,1,1,32,1,1,32,1,1,32
52 DATA 4,4,32,3,3,32,1,1,32,3,3,32,3,3,32,4,3,212
53 DATA 4,4,32,3,3,32,1,1,32,4,4,32,4,4,32,4,4,32
54 DATA 4,4,32,3,3,32,1,1,32,1,1,32,1,1,32,1,1,32
55 DATA 4,4,32,3,3,32,1,1,32,3,3,32,3,3,32,4,3,212
56 DATA 4,4,32,3,3,32,1,1,32,4,4,32,4,4,32,4,4,32
57 DATA 4,4 32,3,3,32,1,1,32,1,1,32,1,1,32,1,1,32
58 DATA 4,4,32,3,3,32,3,3,32,3,3,32,3,3,32,4,3,212
59 REM R
60 DATA 4,4,32,4,4,32,4,4,32,4,4,32,4,4,32,4,4,32
61 DATA 4,4,32,4,3,214,1,1,32,1,1,32,1,1,32,1,1,32
62 DATA 4,4,32,3,3,32,1,1,32,3,3,32,3,1,214,4,1,212
63 DATA 4,4,32,3,3,32,1,1,32,4,1,214,4,1,212,4,4,32
64 DATA 4,4,32,3,3,32,1,1,32,1,1,32,4,4,32,4,4,32
65 DATA 4,4,32,3,3,32,1,1,32,3,1,213,4,1,213,4,4,32
66 DATA 4,4 32,3,3,32,1,1,32,4,3,213,3,1,213,4,1,215
67 DATA 4,4,32,3,3,32,1,1,32,4,4,32,3,3,32,1,1,32
68 DATA 4,4,32,3,3,32,4,3,212,4,4,32,3,3,32,4,3,212
```

```
1 REM ## BYC=> SQUAR 384
2 MODE 1 SYMBOL AFTER 90:INK 0,1
3 FOR C=1 TO 48
4 READ ASCII,A1,A2,A3,A4,A5,A6,A7,A8
5 SYMBOL ASCII,A1,A2,A3,A4,A5 A6,A7 A8
6 NEXT C
7 DATA 97,107,170,126,1 2 102,60,24,6
8 DATA 104 36,51,50 48,16,48,120,0
9 DATA 107,103,107,34,36,34,102,103,6
10 DATA 113,110 51 9 ,99,99,54,28,0
11 DATA 91,0,28,62 127,127 127,54,0
12 DATA 93 28,8,127 127,127,28,28,62
13 DATA 92,28,8,127 127,62,28,8,0
14 DATA 119,18,56,124 254 124,56,16,0
15 DATA 101,247,201,150,161,128,128 128,128
16 DATA 114,238,142,103,133,1.1,1,1
17 DATA 116,8,179,66,179,8,66 34,24
18 DATA 121,129,195,193,231,255,219,255,255
19 DATA 127,255,255,219,255,231,195,193,129
20 DATA 105 24,36 66,0,127,66,129,0
21 DATA 101,1,1,1,1,133,105,147,239
22 DATA 117,178,136,129,178.161,150,201,247
23 DATA 115,128,129 194,228,224,224,240,248
24 DATA 100,0,0,102,255,0,66 60,0
25 DATA 102 1,129,67,167,7,7,15,31
26 DATA 103,31,15,7,7,167,67,129,1
27 DATA 104,248,240 224,224 224,194,129,128
28 DATA 100,0,60,66,0,255,102,0,0
29 DATA 122 60,170,170,255,255,127,126,60
30 DATA 120,60,126,127,255,255,170,170,60
31 DATA 99,24,255,255,240,140,89,30,30
32 DATA 118,28,30,89,140,24,255,255,24
33 DATA 98,60,126,195,231,126,60,24,0
```



```
34 DATA 130,0,24,60,126,231,195,126,60
35 DATA 131,31,55,99,195,195,227,247,255
36 DATA 123,255,28,227,193,193,99,55,31
37 DATA 131,176,28,24,24,24,24,24,0
38 DATA 132,0,126,195,6,60,96,192,60
39 DATA 133,0,60,102,96,56,56,98,60
40 DATA 134,0,120,48,127,51,54,60,48
41 DATA 135,0,80,102,96,80,6,70,120
42 DATA 137,0,24,24,28,48,96,98,126
43 DATA 177,1,3,7,14,28,56,112,224
44 DATA 178,128,192,224,112,56,28,14,7
45 DATA 179,0,1,3,7,14,28,28,56
46 DATA 180,192,128,257,17,17,17,28,0
47 DATA 181,3,1,221,30,200,16,28,0
48 DATA 182,0,128,88,224,112,56,56,28
49 DATA 183,56,56,16,28,30,15,7,1
50 DATA 184,48,81,185,285,49,121,0,255
51 DATA 185,198,74,16,223,78,207,0,250
52 DATA 186,26,28,60,56,120,240,224,128
53 DATA 187,255,31,1,3,7,31,63,255
54 DATA 188,255,240,128,192,224,240,252,255
55 BACK$ "       ::1: 1b1: real 1b1: real 1b1: 11
 :
56 WINDOW £1,2,7,2,10:WINDOW £2,16,25,2,10:WINDOW £3,
18,25,2,1:WINDOW £4,26,31,2,10:WINDOW £5,34,39,2,10:WINDOW £6,15,40,14,25:WINDOW £7,1,14,14,25
57 DIM PACK(52),H$(10),C$(10),S$(10),D$(10),H(5),V(5),C
OL(5):BANK=10
58 FOR C=1 TO 52:PACK(C)=0:NEXT C:FOR I=1 TO 5:H(I)=0:N
EXT I
59 REM
60 REM DATA FOR RON-COLOUR CARDS
61 H$(1)="A
62 H$(2)="2
63 H$(3)="3
64 H$(4)="4
65 H$(5)="5
66 H$(6)="6
67 H$(7)="7
68 H$(8)="8
69 H$(9)="9
70 H$(10)="10
71 C$(1)="A
72 C$(2)="2
73 C$(3)="3
74 C$(4)="4
75 C$(5)="5
76 C$(6)="6
77 C$(7)="7
78 C$(8)="8
79 C$(9)="9
80 C$(10)="10
81 S$(1)="A
82 S$(2)="2
83 S$(3)="3
84 S$(4)="4
85 S$(5)="5
86 S$(6)="6
87 S$(7)="7
88 S$(8)="8
89 S$(9)="9
90 S$(10)="10
91 D$(1)="A
92 D$(2)="2
93 D$(3)="3
94 D$(4)="4
95 D$(5)="5
96 D$(6)="6
97 D$(7)="7
98 D$(8)="8
99 D$(9)="9
100 D$(10)="10
101 PAPER £3,2:PEN £3,4:PRINT £3,S$(1);
102 A$=INKEY$
103 LOCATE 6,20:PRINT "PRESS SPACE BAR "
104 IF A$=" " THEN GOTO 107
105 IF A$=CHR$(13) THEN GOTO 102
106 GOTO 102
107 CLS BANK=10
108 PRINT "WELCOME TO ";:PEN 3:PRINT "POKER";:PEN 1:PRI
NT ","
109 PRINT:PRINT:PRINT"YOU HAVE £10 IN THE BANK, AND YOU
"
110 PRINT:PRINT"DESPERATELY NEED MORE MONEY, SO YOU"
111 PRINT:PRINT"TURN TO GAMBLING ! "
112 PRINT:PRINT:PRINT "OBVIOUSLY IF YOU LOSE ALL YOUR M
ONEY"
113 PRINT:PRINT"YOU'RE FINISHED !!"
114 PRINT:PRINT:PRINT"HOW LONG CAN ";:PEN 3:PRINT "YOU
";:PEN 1:PRINT "LAST ?"
115 A$=INKEY$
116 LOCATE 6,20:PRINT "PRESS ";:PEN 3:PRINT "SPACE BAR"
;:PEN 1: PRINT " TO START"
117 IF A$=" " THEN GOTO 122
118 IF A$=CHR$(13) THEN GOTO 115
119 GOTO 115
120 REM *** START GAME ***
121 VOLUME 7
122 INK 0,0:CLS
123 FOR C=1 TO 5:PAPER £C,2:PEN £C,3:CLS £C:PRINT £C,
CK$;
124 NEXT C:PAPER £6,1:CLS £6:PAPER £7,3:PEN £7,0:CLS £7

125 REM *   START GAME  *
126 CLS £6
127 PEN £7,1:PRINT £7,"   ODDS":PEN £7,0:PRINT £7
128 PRINT £7,"R FLUSH:2000/1";
129 PRINT £7,"S FLUSH:1000/1";
130 PRINT £7,"FLUSH   :500/1";
131 PRINT £7,"STRAIGHT:250/1";
132 PRINT £7,"F HOUSE :100/1";
133 PRINT £7,"4 KIND  : 50/1";
134 PRINT £7,"3 KIND  : 10/1";
135 PRINT £7,"2 PAIR  :  5/1";
136 PRINT £7,"2 ACES  :  2/1";
137 PRINT £6:PRINT £6," BANK = £";BANK
138 PEN £6,4:PRINT £6:PRINT £6:PRINT £6," AFTER TYPING
IN BET"
139 PRINT £6:PRINT £6," PRESS ";:PEN £6,3:PRINT £6,"EN
TER ":PEN £6,4
140 PRINT CHR$(7):PRINT £6:INPUT £6," BET £",BET$
141 BET=VAL(BET$):BET$=""
142 IF BET>BANK THEN PRINT £6:PRINT £6,"FOR SUCH, TRY
AGAIN !":FOR T=1 TO 2000:NEXT T:CLS £6:GOTO 137
143 CLS £6
144 FOR J=1 TO 5:GOSUB 206
145 NEXT J
146 LOCATE 1,12:PRINT"    1        2        3       4
    5 "
147 PEN £6,4
148 CLS £6
149 PRINT £6
150 PRINT £6," ENTER CARDS YOU WANT "
151 PRINT £6," TO KEEP, 1 - 5 "
152 PRINT £6
153 PRINT £6," PRESS ";:PEN £6,3:PRINT £6," E ";:PEN £6,4

154 PRINT £6:PRINT £6," TO COMPLETE ENTRY "
155 PRINT £6
156 PRINT £6:PRINT £6," OR ";:PEN £6,3:PRINT £6," C ";:
PEN £6,4:PRINT £6," TO CANCEL ENTRIES"
157 FOR Z=1 TO 5:H(Z)=0:NEXT Z
158 A$=INKEY$:PEN 3
159 IF A$="1" THEN H(1)=1:LOCATE 3,12:PRINT "HOLD";CHR$
(7)
160 IF A$="2" THEN H(2)=1:LOCATE 11,12:PRINT "HOLD";CHR
$(7)
161 IF A$="3" THEN H(3)=1:LOCATE 19,12:PRINT "HOLD";CHR
$(7)
162 IF A$="4" THEN H(4)=1:LOCATE 27,12:PRINT "HOLD";CHR
$(7)
163 IF A$="5" THEN H(5)=1:LOCATE 35,12:PRINT "HOLD";CHR
$(7)
164 IF A$="E" OR A$="e" THEN GOTO 168
165 IF A$="C" OR A$="c" THEN LOCATE 1,12:PRINT"    1
   2        3        4        5 ":GOTO 157
166 IF INKEY(18)=0 OR INKEY(63)=0 THEN GOTO 158
167 GOTO 158
168 PEN 1:FOR I=1 TO 5
169 IF H(I)=1 THEN GOTO 171
170 IF H(I)=0 THEN PAPER £I,0:CLS £I:FOR T=1 TO 100:NE
XT T:PAPER £I,2:PEN £I,3:PRINT £I,BACK$;
171 NEXT I
172 CLS £6:FOR I=1 TO 5:IF H(I)=0 THEN GOSUB 206
173 NEXT I
174 H(1)=MAX(V(1),V(2),V(3),V(4),V(5)):FOR I=1 TO 5:IF
V(I)=H(1) THEN V(I)=0:GOTO 176
175 NEXT I
176 H(2)=MAX(V(1),V(2),V(3),V(4),V(5)):FOR I=1 TO 5:IF
V(I)=H(2) THEN V(I)=0:GOTO 178
177 NEXT I
178 H(3)=MAX(V(1),V(2),V(3),V(4),V(5)):FOR I=1 TO 5:IF
V(I)=H(3) THEN V(I)=0:GOTO 180
179 NEXT I
180 H(4)=MAX(V(1),V(2),V(3),V(4),V(5)):FOR I=1 TO 5:IF
V(I)=H(4) THEN V(I)=0:GOTO 182
181 NEXT I
182 H(5)=MAX(V(1),V(2),V(3),V(4),V(5)):FOR I=1 TO 5:IF
V(I)=H(5) THEN V(I)=0:GOTO 184
183 NEXT I
184 IF((H(1)=H(2)=H(3)=H(4))/4=H(4))OR((H(2)+H(3)+H(4)+
H(5))/4=H(5)) THEN W=50:W$="FOUR OF A KIND":GOTO 194
185 IF(H(5)=1)AND(H(1)=13)AND(H(2)=12)AND(H(3)=11)AND(H
(4)=10)AND(COL(1)=COL(2))AND(COL(2)=COL(3))AND(COL(3)=C
OL(4))AND(COL(4)=COL(5)) THEN W=2000:W$="A ROYAL FLUSH
":GOTO 194
186 IF((H(5)=1)AND(H(1)=13)AND(H(2)=12)AND(H(3)=11)AND(
H(4)=10))THEN W=250:W$="A STRAIGHT":GOTO 194
187 IF((H(1)-H(2)=1)AND(H(2)-H(3)=1)AND(H(3)-H(4)=1)AND
(H(4)-H(5)=1)) THEN W=250:W$="A STRAIGHT ":GOTO 194
188 IF((H(5)=H(4))AND(H(4)=H(3))AND(H(2)=H(1)))OR((H(1)
=H(2))AND(H(2)=H(3))AND(H(4)=H(5)))THEN W=100:W$="A FU
LL HOUSE":GOTO 194
189 IF((H(5)=H(4))AND(H(4)=H(3)))OR((H(4)=H(3))AND(H(3)
=H(2)))OR((H(3)=H(2))AND(H(2)=H(1))) THEN W=10:W$="THR
EE OF A KIND":GOTO 194
190 IF((H(5)=H(4))AND(H(3)=H(2)))OR((H(4)=H(3))AND(H(2)
=H(1)))OR((H(5)=H(4)) AND(H(2)=H(1))) THEN W=5:W$="TWO
PAIR":GOTO 194
191 IF(H(5)=1 AND H(4)=1) AND H(3)<>1 THEN W=2:W$="A P
AIR OF ACES":GOTO 194
192 IF((COL(1)=COL(2))AND(COL(2)=COL(3))AND(COL(3)=COL
(4))AND(COL(4)=COL(5))) THEN W=500:W$="A FLUSH":GOTO 19
4
193 W=0:W$="USELESS  "
194 PRINT £6:PRINT £6," YOUR HAND WAS ":PRINT £6:PEN £6
,3:PRINT £6," ";W$:PEN £6,4
195 IF W>0 THEN BANK = BANK +(BET*W):PRINT £6:PRINT £6,
" YOU WIN £";BET*W:GOSUB 350:GOTO 198
196 IF W=0 THEN BANK = BANK - BET:PRINT £6:PRINT £6," Y
OU LOSE £";BET:GOSUB 359
```

A good investment

To invest or not to invest ... ask your Spectrum with the help of ***John de Rivaz***

Investors with successful portfolios of shares are often mailed with offers to re-invest their money in insurance or other managed funds. Such re-investment has advantages, typically avoidance of the uncertainties, costs and delays of probate, capital transfer tax, income tax, annual accountants' fees etc.

However, in order to move funds from portfolios of shares that may reasonably be expected to go on growing into a managed fund with equal growth potential can cause considerable expense, particularly when viewed at the end of an investment period of 20 years. This is the usual example quoted in advertisements extolling the virtues of these funds.

This program evaluates this. The initial capital and tax liability are inserted as *Data* statements in Line 40. Don't forget to include selling costs and accountant's fees. The user can then select different growth rates and see the result after 20 years, or some other period as set in Line 50. It is then, of course, up to the user to decide whether the saving of capital transfer tax, probate costs and delays, etc, are worth it.

If the growth rate of the managed bond is not quoted as a compound percentage, the program will calculate it for you from the start and end figures.

Program notes

The program is written for the Spectrum, but is readily usable on any microcomputer without the colour statements.

1 to 50	Set up
90	Message
100	Input of growth rate or function
101 to 108	Error trapping and function selection
110 to 180	Main loop
900	Read subroutine
1000 to 1040	Print annual results over period
1100 to 1170	Calculate compound growth percentage

```
   1 INK 7: PAPER 1: BORDER 1: C
LS
  10 REM LUMP SUM INVESTMENT
  20  REM (C) RTL 1983
  25 LET flag=0
  30 REM Enter  here the capital
to be invested.  and the capital
gains   tax   and   professional
charges on realising it.
  40 DATA 20000,5000
  45 REM Enter  here  the number
of years program is to cover
  50 DATA 20
  90 PRINT  INK 7; PAPER 4;AT 14
,0;"If  the  advertisement  does
 notgive  a  percentage  growth
ratebut  instead  gives  a start
 andend  figure  over  a  number
  ofyears, then enter 'd' to hav
e itworked out for you."
 100 INPUT "What  is  the  proje
cted  growthrate, compound perce
nt?          Press e to end";a$
 101 CLS
 102 IF a$="d" THEN  GO TO 1100
 103 IF a$="e" THEN  STOP
 104 IF CODE (a$( TO 1))<CODE ("
0") OR CODE (a$( TO 1))>CODE ("9
") THEN  GO TO 100
 108 LET p=VAL (a$)
 110 GO SUB 900
 120 GO SUB 1000
 130 INPUT "Press  any  key  to
disturb yourcapital'";a$
 140 LET result=capital
 150 GO SUB 900: LET capital=cap
ital-tax: GO SUB 1000
 160 PRINT  INK 7; BRIGHT 1; PAP
ER 2;"That lost you £"; FLASH 1;
INT (result-capital); FLASH 0;".
"
 180 GO TO 100
 800 STOP
 900 RESTORE 40: READ capital,ta
x,period: RETURN
1000 PRINT "Year","Capital"
1010 FOR y=1 TO period
1020 PRINT y,INT capital
1030 LET capital=capital*(1+p/10
0)
1040 NEXT y: RETURN
1100 CLS : PRINT "Calculation of
 growth rate"'
1110 INPUT "Start figure";start
1120 INPUT "End figure";end
1130 INPUT "No of years";years
1140 LET p=((end/start)↑(1/years
)-1)*100
1150 PRINT "Growth is ";INT p;"%
 compound."'"Press any key to co
ntinue."
1160 LET a$=INKEY$: IF a$="" THE
N  GO TO 1160
1170 CLS : GO TO 110
```

Macro processing

Part Two of PBank for the Commodore 64 written by ***Adrian Warman***

One of the aims of this program is to show the use of Macros. On the CBM Macro-Assembler, the source code listing does *not* show the actual machine code numbers for a Macro. It is assumed that the coding for a given Macro will have been written and tested independently of the primary program. Hence even when the Macro is referred to in the main program, no visible expansion of code occurs, other than a sudden jump in the memory locations (see for example Line# 54 of the source code).

Lines 10-17 The Macro itself in the CBM Macro-Assembler, the start of the Macro is indicated by the Pseudo-op *.mac*, and the end of the Macro by *.mnd*. This Macro is given the name *vec*, and is intended to calculate the value of a vector in a table with its position indexed by the contents of the *X* register. Furthermore, this vector may be modified by a relative number of memory pages by a user defined factor. Once calculated, the vector is placed into a user-specified zero-page location.

Lines 11-12 Find the low byte of the vector. Store it at the chosen location.

Lines 13-16 Find the high byte of the vector. Add in the number of memory pages displacement, and place into its zero-page location.

Lines 22-28 Various system and program addresses and locations.

Lines 33-34 A jump table to make the command numbers easier to remember.

Lines 39-45 Storage locations used by the program. These are the flags to show whether a storage screen has valid data in it, and also locations to keep track of which screens are being moved.

Lines 50-54 This is the loop-up table used by the Macro to find the positions of the various screens in memory. The storage screens are held in the Ram behind the Basic Roms. The main screen location is identified when the program is initialised.

Lines 58-62 The initialisation routine. First of all, clears out the usage flags for the storage screens, and also the locations identifying which screens are being transferred.

Lines 63-64 Find the current position of the main screen, and set up the look-up table with its address.

Line 65 Update the flags to show that the main screen has valid data. This is done to make coding shorter, as otherwise special tests would have to be carried out to see which screen was being used. By treating the main screen in exactly the same way as any of the other storage

```
00068  c02b                ;
00069  c02b                ;invalid page use error.
00070  c02b                ;
00071  c02b  a2 15          error  ldx #$15
00072  c02d  4c 37 a4       jmp    errmsg
00073  c030                ;
00074  c030                ;
00075  c030                ;main copy routine.
00076  c030                ;
00077  c030  20 d3 c0       copy   jsr getval       ;find page a
00078  c033  8e 0d c0       stx    from
00079  c036  bd 06 c0       lda    pagusd,x         ;has it been used?
00080  c039  f0 08          beq    errstp
00081  c03b  20 d3 c0       getnxt jsr getval       ;find page b.
00082  c03e  ec 0d c0       cpx    from             ;is it valid to copy?
00083  c041  f0 e8          errstp beq error
00084  c043  bd 06 c0       lda    pagusd,x         ;show page now used
00085  c046  09 01          ora    #%00000001
00086  c048  9d 06 c0       sta    pagusd,x
00087  c04b                ;
00088  c04b                ;valid to copy, so do it.
00089  c04b                ;
00090  c04b  8a             txa                     ;find address index of dest.
00091  c04c  0a             asl    a
00092  c04d  aa             tax
00093  c04e  8e 0c c0       stx    to               ;preserve index
00094  c051                 vec    dest,0           ;get vector.
00102  c05e  ad 0d c0       lda    from             ;find address of source.
00103  c061  0a             asl    a
00104  c062  aa             tax
00105  c063  8e 0d c0       stx    from             ;preserve index.
00106  c066                 vec    source,0
00114  c073                ;
00115  c073  78             sei                     ;prevent irq problems.
00116  c074  a5 01          lda    chipio           ;remove basic roms.
00117  c076  29 fe          and    #%11111110
00118  c078  85 01          sta    chipio
00119  c07a                ;
00120  c07a  20 c0 c0       jsr    trans            ;copy characters across.
00121  c07d                ;
00122  c07d  ae 0d c0       ldx    from             ;what was source screen.
00123  c080  f0 0f          beq    fromin
00124  c082                 vec    source,4         ;find colour store of page
00132  c08f  90 08          bcc    findto
00133  c091  a9 00          fromin lda #$00         ;find colour nybbles.
00134  c093  85 fb          sta    source
00135  c095  a9 d8          lda    #$d8
00136  c097  85 fc          sta    source+1
00137  c099                ;
00138  c099  ae 0c c0       findto ldx to           ;what is dest screen?
00139  c09c  f0 0f          beq    tomain
00140  c09e                 vec    dest,4
00148  c0ab  90 08          bcc    copcol
00149  c0ad  a9 00          tomain lda #$00
00150  c0af  85 fd          sta    dest
00151  c0b1  a9 d8          lda    #$d8
00152  c0b3  85 fe          sta    dest+1
00153  c0b5                ;
00154  c0b5  20 c0 c0       copcol jsr trans        ;copy colour data.
00155  c0b8                ;
00156  c0b8  a5 01          lda    chipio           ;restore basic roms.
00157  c0ba  09 01          ora    #%00000001
00158  c0bc  85 01          sta    chipio
00159  c0be  58             cli                     ;re-enable interrupts.
00160  c0bf                ;
00161  c0bf  60             rts
00162  c0c0                ;
00163  c0c0                ;
00164  c0c0                ;transfer subroutine.
00165  c0c0                ;
00166  c0c0  a2 04          trans  ldx #$04         ;dex loop control.
00167  c0c2  a0 00          ldy    #$00
00168  c0c4  b1 fb          aloop  lda (source),y   ;copy characters.
00169  c0c6  91 fd          sta    (dest),y
00170  c0c8  c8             iny
00171  c0c9  d0 f9          bne    aloop
00172  c0cb  e6 fc          inc    source+1         ;move to next memory page.
00173  c0cd  e6 fe          inc    dest+1
00174  c0cf  ca             dex
00175  c0d0  d0 f2          bne    aloop            ;check if all done?
00176  c0d2  60             rts
00177  c0d3                ;
```

screens, the coding involved is reduced.

Lines 71-72 If a chosen page does not contain valid data, or an attempt was made to copy back into the same screen eg *Sys 49152,2,2* then an illegal direct error is produced by this section of the program.

Lines 77-80 Find the page number *from*. If it hasn't been used (ie does not contain valid screen data), produce an error message

Lines 81-83 Find the page number of the *to* screen. If it is the same as *from*, give an error message

Lines 84-86 Set the flag to show that page *to* now has valid data in it.

Lines 90-93 Convert the to screen number into an index to the screen location table. Store this for use during colour nybble transfer

Line 94 The use of the Macro will calculate the address of the to page, and put this exact value into the system location *dest* in zero-page

Lines 102-106 Similarly, calculate the address for the *from* page, and place it into *source* in zero-page

Lines 115-118 Prevent IRQ events, and remove the Basic Roms to get the Ram from *$A000* to *$BFFF*

Line 120 Copy four memory pages from position in *source* to the position in *dest*.

Lines 122-122 What was the source screen? If it was screen 0 (ie, the main screen) then the colour nybbles are stored at an entirely different location

Lines 124 *X* contains the index for one of the storage screens, so use the Macro to calculate the exact address of where the colour nybbles are to be stored (immediately after the character data) Here, the displacement of four memory pages is used, since the character storage took up these four pages, hence we wish to address the memory that follows

Line 132 Jump to locate where the *to* screen colours will go

Lines 133-136 We are accessing the main screen colour nybbles, which are always at *$D800*, so put this address into *scorce* in zero-page

Lines 138-122 Having calculated the address of the colour data of the from screen, calculate the address of the colour data for the to screen in a similar fashion

Line 154 Transfer the four memory pages of the colour nybbles from 'source' to 'dest'

Lines 156-161 Restore the Basic Roms, re-enable the interrupts, and return to the calling program

Lines 168-178 *Trans* will copy four memory pages of data using indirect addressing. The start address of the source data is held in *source*, while the destination address is held in *dest*.

Lines 181-187 *Getval* performs three roles. First, a check is made to ensure that the syntax of the command is correct, by searching for a comma. Then, a value in the range 0 to 255 inclusive is located. This value being returned in the *X* register. If a value outside this range is found, an error message is automatically generated. Finally, a check is made to ensure that this value is less than five, in other words, that the number is a valid screen number

```
00178  c0d3                 ;
00179  c0d3                 ;get the next value.
00180  c0d3                 ;
00181  c0d3  20 fd ae       getval jsr  tstcom
00182  c0d6  20 9e b7       jsr    getbyt
00183  c0d9  e0 05          cpx    #$05
00184  c0db  90 05          bcc    exit
00185  c0dd  a2 0e          ldx    #$0e            ;illegal quantity error
00186  c0df  4c 37 a4       jmp    errmsg
00187  c0e2  60             exit   rts
00188  c0e3                 ;
00189  c0e3                 .end



symbol table

symbol value
 chipio  0001   copcol  c0b5   copy    c030   dest    00fd
 errmsg  a437   error   c02b   errstp  c041   exit    c0e2
 finsto  c099   frmain  c091   from    c00b   getbyt  b79e
 getnxt  c03b   getval  c0d3   hibase  0288   iloop   c01b
 init    c017   mloop   c0c4   page1   c00f   page2   c011
 page3   c013   page4   c015   pagusd  c006   screen  c00d
 source  00fb   start   c000   to      c00c   tomain  c0ad
 trans   c0c0   tstcom  aefd   vec     ffff
```

PBANK DEMONSTRATION PROGRAM.

```
100 POKE 53280,0
110 POKE 53281,11
120 PRINT CHR$(147)
130 SYS 49155
140 :
150 FOR LOOP=1 TO 4
160  PRINT MID$(CHR$(5)+CHR$(159)+CHR$(30)
 +CHR$(158),LOOP,1)
170  PRINT "GOING TO PAGE NUMBER";LOOP
180  SYS 49152,0,LOOP
190 NEXT LOOP
200 :
210 FROM=INT(RND(0)*4)+1
220 PRINT CHR$(19);"        PRESS A KEY TO
 RETURN PAGE";FROM
230 GET IN$
240 IF IN$="" THEN GOTO 230
250 SYS 49152,FROM,0
260 :
270 GOTO 210
```



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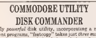
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*Design your own sounds using the Envelope command with this program for the BBC B written by **Sunil Perekh***

This program, designed for the BBC B micro, will assist the keen programmer when creating sounds for their own game, application or whatever, based as it is on the complicated *Envelope* command.

Full notation of the command is *Envelope E* (envelope no), *T* (timebase), *P1* (Pitch 1), *P2, P3, D1* (Duration 1), *D2, D3, At* (Attack), *De* (Decay), *Su* (Sustain), *Re* (Release), *V1* (Volume level reached by At), and *V2* (Volume level reached by De). Each parameter is displayed on-screen, and can be altered at will. Controls are as follows.

The row of keys *'ASDF'* are the white keys of the piano, *'QWER'* being the black ones. Number keys provide a quick way to change the time base. The three keys to the right of the number keys provide a primitive recording facility, being 'Play', 'Start Recording', and 'Stop Recording' respectively. The variables can be altered by pressing control and the stated key.

Program Notes

Line No	
80-120	Set up screen and initiate variables
200-800	Test keys and find Pitch
810-900	Update screen and sound note
990	Procupdate
1000-1100	Procscreen

Procedures

Procscreen	Sets up screen display
Procupdate	Puts new values of variables on screen

GAIN (+)	DECREASE (−)	VARIABLE
Q	W	Env Number
E	R	Time Base
T	Y	Pitch 1
U	I	Pitch 2
O	P	Pitch 3
A	S	Duration 1
D	F	Duration 2
G	H	Duration 3
J	K	Volume 1
L	,	Volume 2
Z	X	Attack
C	V	Decay
B	N	Sustain
M	,	Release

```
  0 REM
  1 REM S  !!  written by SUNIL PAREKH
  2 REM
  3 REM (C  1984 Sunil Parekh
  5 REM
 40 *FX1 ,5
 50 *F  '1,10
 60 MODE 7
 70 PROCSCREEN
 80 VDU 23, ,0;0;0;0,0;
 90 E=2:P1=4:P2=4;P3=8.D1=10:D2=10:D3=10.AT
=127:DE 1:SU=-1:RE=-2:V1=127:V2=100
 92 PLAY=0.REC=0:Z=0
 96 DIM B(100)
 97 FOR LOOP =   TO 1   :LET B(LOOP)=0 NEXT
LOOP
100 P=256
110 T=1
120 A INKEY(0)
125 *FX15.1
126 IF  REC = 1 THEN LET B(Z) A
127 IF REC =1 : Z=Z+1:IF Z=100 THEN LET REC
= .PROCUPDATE:GOTO 120
130 IFA =48ANDA<=57THENT=(A-48)*2:GOTO650
132 IF A=&2D THEN PLAY=1:PRINT TAB(2,1); "P
LAYING";:Z=0:A=B(Z):GOTO 125
134 IF A=&3D THEN LET PLAY =0:PRINT TAB(2,1
.         ";:Z=0:GOTO 120
135 IF A=&5E THEN LET REC =0:LET ZA=Z:Z=0:P
ROCUPDATE:GOTO 120
136 IF A=&5C AND PLAY=0 THEN LET REC =1:PRO
CUPDATE:GOTO 120
140 IFA=48THENT=1:GOTO650
150 IFA=&41THENP=73:GOTO650
160IFA=&57THENP=77:GOTO650
170IFA=&53THENP=81:GOTO650
180IFA=&45THENP=85:GOTO650
190IFA=&44THENP=89:GOTO650
200IFA=&52THENP=93:GOTO650
210IFA=&46THENP=97:GOTO650
220IFA=&47THENP=101.GOTO650
230IFA=&59THENP=105:GOTO650
240IFA=&48THENP=109:GOTO650
250IFA=&55THENP=113:GOTO650
260IFA=&4ATHENP=117:GOTO650
270IFA=&49THENP=121:GOTO650
280IFA=&4FTHENP=125:GOTO650
290IFA=&4CTHENP=129:GOTO650
300IFA=&50THENP=133:GOTO650
310IFA=&2BTHENP=137:GOTO650
320IFA=&40THENP=141:GOTO650
330IFA=&2ATHENP=145:GOTO650
340IFA=&7DTHENP=149:GOTO650
350IFA=&11THENE=E+1:IFE>4THENE=1:GOTO650
360IFA=&17THENE=E-1:IFE<1THENE=4:GOTO650
370IFA=&05THENT=T-1:IFT 1THENT=127:GOTO650
380IFA=&12THENT=T+1:IFT>127THENT=0:GOTO650
390IFA=&14THENP1=P1+1:IFP1>127THENP1=-128 G
OTO650
400 IFA=&19THENP1=P1-1:IFP1 -128THENP1=127:
GOTO650
410IFA=&15THENP2=P2+1:IFP2>127THENP2=-128:G
OTO650
420IFA=&09THENP2=P2-1:IFP2<-128THENP2=127 G
OTO650
430IFA=&0FTHENP3=P3+1:IFP3>127THENP3=-128:G
OTO650
440IFA=&10THENP3=P3-1.IFP3 -128THENP3=127:G
OTO650
450IFA=&01THEND1=D1+1.IFD1>255THEND1=0:GOTO
650
460IFA=&13THEND1=D1-1:IFD1 0THEND1=255:GOTO
650
470IFA=&04THEND2=D2+1:IFD2>255THEND2=0:GOTO
650
480IFA=&06THEND2=D2-1:IFD2<0THEND2=255:GOTO
650
490IFA=&07THEND3=D3+1:IFD3>255THEND3=0:GOTO
650
500IFA=&08THEND3=D3-1:IFD3<0THEND3=255:GOTO
650
510IFA=&0ATHENV1=V1+1:IFV1 126THENV1=0:GOTO
650
520IFA=&0BTHENV1=V1-1:IFV1<0THENV1=126:GOTO
650
530IFA=&0CTHENV2=V2+1:IFV2>126THENV2=0:GOTO
650
540IFA=&3BTHENV2=V2-1:IFV2<0THENV2=126:GOTO
650
550IFA=&1ATHENAT=AT+1:IFAT>127THENAT=-127:G
OTO650
560 IFA=&18THENAT=AT-1:IFAT<-128THENAT=127:
GOTO650
570IFA=&03THENDE=DE+1:IFDE 127THENDE=-127:G
OTO650
580IFA=&16THENDE=DE-1:IFDE -128THENDE=127 G
OTO650
590IFA=&02THENSU=SU+1:IFSU>0THENSU=-127:GOT
O650
600IFA=&0ETHENSU=SU-1:IFSU<-127THENSU=0:GOT
O650
610IFA=&0DTHENRE=RE+1:IFRE 0THENRE=-127:GOT
O650
620IFA=&2CTHENRE=RE-1:IFRE -127THENRE=0 GOT
O650
630 PROCUPDATE
635 IF PLAY =1 THEN GOTO 645
640 GOTO120
645 Z=Z+1:IF Z>=100 OR Z=ZA-1 THEN Z=0:A=&3
D:PLAY=0:GOTO 134
646 A=B(Z):GOTO 125
```

```
650 PROCUPDATE
660ENVELOPE1,T,0,0,0,0,0,0,AT,DE,
BU,RE,V1,V2
670 IFE=1THEN700
675 REM
6B0 REM  Play the note
685 REM
690 ENVELOPEE,T,P1,P2,P3,D1,D2,D3,
AT,DE,SU,RE,V1,V2
700 SOUND1,E,P,1
710 SOUND2,E,P,1
720 GOTO 120
724 REM
725 REM
730 DEFPROCUPDATE
735 IF REC =1 THEN PRINT TAB(2,0):
CHR$(136);"RECORDING"; ELSE PRINT
 TAB(2,0);"
";
740 PRINT TAB(15,3);E:PRINTTAB(33,
3);T;"  "
750 PRINTTAB(11,5);P;"  ":PRINTTAB
(16,5);P1;"  "::PRINTTAB(34,5);D1;"
 "
760 PRINTTAB(11,7);P;"  ":PRINTTAB
(16,7);P2:"  ";:PRINTTAB(34,7);D2;"
 "
770 PRINTTAB(11,9);F;"  ":PRINTTAB
(16,9);P3;"  "::PRINTTAB(34,9);D3;"
 "
7B0 PRINTTAB(10,14);AT;"   ":PRINT
TAB(17,16):"   ";OE:PRINTTAB(25,1B)
;SU;"   ":PRINTTAB(33,20);RE;"   "
790 PRINTTAB(21,22);V1;"  ":PRINTTA
B(21,23);V2;"  "
B00 ENDPROC
B04 REM
B05 REM
B10 DEF PROCSCREEN
B20 PRINTTAB(15,0);"SYNTHESISER"
B30  PRINTTAB(0,3);"ENVELOPE NO.:":
PRINTTA B(21,3);"TIME BASE:"
B40  PRINTTAB(0,5);"PITCH 1 :":PRIN
TTAB(21,5);"DURATION 1:"
B50 PRINTTAB(0,7);"PITCH 2 :":PRINT
TAB(21, 7);"DURATION 2:"
B60 PRINTTAB(0,9);"PITCH 3 :":PRINT
TAB(21,9);"DURATION 3:"
B70PRINTTAB(16,12);"AMPLITUDE"
BB0PRINTTAB(0,14);"ATTACK :":PRINTT
AB(B,16 );"DECAY :"
B90PRINTTAB(14,1B);"SUSTAIN :":PRIN
TTAB(22 ,20);"RELEASE :"
900 PRINTTAB(0,22);"AMPLITUDE LEVEL
 1 :":PRINTTAB(0,23);"AMPLITUDE LEV
EL 2 :"
910 ENDPROC
```



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Quantum graphics

On-screen drawing brought to your OL by ***A S Filby***

This program allows you to create and edit graphic displays on the QL's screen. All of the graphic commands have been implemented in single keystroke commands plus many additional features. Almost all of the screen is available to the user to draw on; only the bottom line of the screen cannot be used, as this is the status line in which information concerning the state of the program is printed.

The status line consists of a display of the current ink and paper colours and the current *x* and *y* coordinate of the cursor. The right hand side of the status line is used for all the inputs (eg Radius of circle) and for displaying other information. This input section is a separate window so that the rest of the status line is not overwritten. A full description of each command is given below.

Program Notes

B – This command allows the user to change the current border, the border colour and width are input by the user.

I – This command circles through all of the ink colours and displays the current ink colour on the status line.

U – This command is the same as the I command except that it is used to change the paper colour.

M – This command is used to change the cursor speed (the number of pixels the cursor moves in one go), the current speed is displayed on the input line and circles through 0 to 40.

P – This command turns *Plot* on or off, if the *Plot* is on the cursor leaves a trail as it is moved.

F – This command turns the *Fill* on or off, to fill a circle first turn *Fill* on, then draw the circle, then ensure to turn the *Fill* off.

A – This command allows the user to draw an *Arc* from the current cursor position to the cursor position when *A* is pressed again. The user is then asked to enter the angle for the *Arc* to pass through.

C – This command allows the user to draw a circle with the centre at the cursor position.

E – This command allows the user to draw an ellipse with the centre at the cursor position. The radius, eccentricity and the angle are input by the user.

L – This command allows the user to draw a line from the current cursor position to the cursor position when *L* is pressed again.

H – This command lists all the instructions to the screen or a printer.

Q – This command must be used to quit the program.

S – This command clears the screen in the current paper colour.

N – This command recolours the screen, the user is asked to type the number of the new colours.

T – This allows the user to enter text at the current cursor position, the user is first asked the character size.

W – This command invokes the compilation procedure. This means that whenever a command is used to draw anything on the screen the command to do this from basic is written to a file on microdrive. This program file can then be loaded and it will produce the picture which you created on the screen. The user enters the name of the new program when this choice is made. This option must be chosen before anything is drawn on the screen that you wish to include in the new program. If this option is chosen again this facility is switched off and the file is closed. The file is also closed by quitting the program.

G – This command switches the spray gun facility on, the radius of the spray can be altered by pressing *F3*.

F1 – This command *Saves* the current screen, excluding the status line to microdrive 2.

F2 – This command loads a screen from microdrive.

F4 – This command changes the mode between mode 4 and mode 8.

The cursor keys are used to move the cursor around the screen.

All the commands are easy to use and it is best to experiment with each one. Some very good effects can made from the spray gun effect if the ink is changed while spraying. All the *saves* and *loads* that are made in the program are made to mdv2, so ensure that a cartridge is kept in mdv2 which has enough space to accommodate a screen.

```
100 REMark
110 REMark [illegible]
120 REMark [illegible]
130 REMark [illegible]
140 REMark
150 [illegible]
160 REPeat MAIN_LOOP
170   TEST_CURSORS
180   PLOT
190   IF KEYROW(...) [illegible] THEN SPEED
200   IF KEYROW(...) [illegible]
210   IF KEYROW(...) [illegible] THEN CPAPER
220   IF KEYROW(...) [illegible] THEN TEXT
230   IF KEYROW(...) [illegible]
240   IF KEYROW(...) [illegible]
250   IF KEYROW(...) [illegible]
260   IF KEYROW(...) [illegible]
270   IF KEYROW(...) [illegible] THEN CFILL
280   IF KEYROW(...) [illegible]
290   IF KEYROW(...) [illegible]
300   IF KEYROW(...) [illegible]
310   IF KEYROW(...) [illegible]
320   IF KEYROW(...) [illegible]
330   IF KEYROW(...) [illegible]
340   IF KEYROW(...) [illegible]
350   [illegible]
360   [illegible]
370   IF KEYROW(...) [illegible]
380   IF KEYROW(...) [illegible]
390 END REPeat MAIN_LOOP
400 REMark
410 DEFine PROCedure SETUP_SCREEN
420   [illegible]
430   MODE [illegible]
440   WINDOW [illegible]
450   PAPER [illegible]
460   WINDOW [illegible]
470   PAPER [illegible]
480   SCALE [illegible]
490   OPEN#3,con_[illegible]
500   [illegible]
510   [illegible]
520   [illegible]
530   [illegible]
540   [illegible]
550   [illegible]
560 END DEFine
570 REMark [illegible]
580 DEFine PROCedure [illegible]
590   FILL [illegible]
600   [illegible]
610   [illegible]
620   [illegible]
630   [illegible]
640   FILL [illegible]
650 END DEFine
660 REMark
670 DEFine PROCedure TEST_CURSORS
680   REPeat LOOP2
690     [illegible]
700     [illegible]
710     [illegible]
720     [illegible]
730     [illegible]
...     [illegible]
940 END DEFine
950 REMark
960 DEFine PROCedure PLOT
970   [illegible]
980   [illegible]
990   [illegible]
1000    [illegible]
1010    [illegible]
1020    [illegible]
1030    [illegible]
1040    [illegible]
1050   END IF
1060 END DEFine
1070 REMark [illegible]
1080 DEFine PROCedure SPEED
1090   [illegible]
1100   [illegible]
```

```
1110 PRINT#2,"SPEED: ";S;
1120 FOR F=1 TO 60:END FOR F
1130 GO TO 1070
1140 END DEFine
1150 REMark
1160 DEFine PROCedure CINK
1170   REPeat LOOP1
1180     IF KEYROW(1)=8 THEN EXIT LOOP1
1190     LET I=I+1:IF I>255 THEN LET I=0
1200     AT#2,0,0:INK I:PAPER#2,I:PRINT#2,"   ":PAPER#2,7
1210     FOR V=1 TO 40:END FOR V
1220   END REPeat LOOP1
1230   IF w THEN PRINT#4;L;" INK ";I:L=L+10
1240 END DEFine
1250 REMark
1260 DEFine PROCedure CPAPER
1270   REPeat LOOP2
1280     IF KEYROW(1)=8 THEN EXIT LOOP2
1290     LET PA=PA+1:IF PA>255 THEN PA=0
1300     AT#2,0,11:PAPER PA:PAPER#2,PA:PRINT#2,"   ":PAPER#2,7
1310     FOR V=1 TO 40:END FOR V
1320   END REPeat LOOP2
1330   IF w THEN PRINT#4;L;" PAPER ";PA:L=L+10
1340 END DEFine
1400 REMark
1360 DEFine PROCedure TEXT
1370   CROSS X,Y
1380   CLS#2:PRINT#2,"[illegible]"
[illegible]
1390   IF CODE(t$)=[illegible] THEN GO TO 1400
1400   CSIZE [illegible]
1410   CURSOR X,Y,0,0
1420   INPUT t$
1430   IF w THEN PRINT#4;L;" CSIZE [illegible]"
[illegible]
1440   CSIZE 0,0
1450   CROSS X,Y
1460 END DEFine
1470 REMark
1480 DEFine PROCedure CLINE
1490   IF L=0
1500     CLS#2:PRINT#2,"LINE":FOR V=1 TO 400:END FOR V:LET I=I:LET IF=0
1510   END IF
1520   IF L=1
1530     CROSS X,Y:LINE [illegible] TO X,Y:CLS#2:CROSS X,Y
1540     IF w THEN PRINT#4;L;" LINE [illegible] TO [illegible]"
[illegible]
1550   END IF
1560   L=NOT L
1570 END DEFine
1580 REMark
1590 DEFine PROCedure DCIRCLE
1600   CROSS X,Y
1610   CLS#2:INPUT#2,"RADIUS? ";R$:IF NOT [illegible] THEN GO TO 1610
1620   CLS#2
1630   CIRCLE X,Y,R
1640   IF w THEN PRINT#4;L;" CIRCLE [illegible]":L=L+10
1650   CROSS X,Y
1660 END DEFine
1670 REMark
1680 DEFine PROCedure ELLIPSE
1700   CROSS X,Y
1710   CLS#2:INPUT#2,"RADIUS? ";R$:IF NOT [illegible] THEN GO TO 1710
1720   INPUT#2,"ECCEN [illegible]":IF NOT [illegible] THEN GO TO 1720
1730   INPUT#2,"ANG [illegible]":IF NOT [illegible] THEN GO TO 1730
[illegible]
1740   [illegible]:CLS#2
1750   CIRCLE X,Y,R,E,AN
1760   IF w THEN PRINT#4;L;" CIRCLE [illegible]"
[illegible]
1780   CROSS X,Y
1790 END DEFine
1800 REMark
1810 DEFine PROCedure CARC
1820   IF A=0
1830     CLS#2:PRINT#2,"ARC":FOR V=1 TO 400:END FOR V:CLS#2
[illegible]
1840   END IF
1850   IF A=1
1860     INPUT#2,"ANGLE? ";an$:CLS#2:IF NOT [illegible] THEN GO TO 1860
1870     CROSS X,Y
1880     ARC [illegible] TO X,Y,an
1890     CROSS X,Y
1900     IF w THEN PRINT#4;L;" ARC [illegible]"
[illegible]
1910   END IF
1920   A=NOT A
1930 END DEFine
1940 REMark
1950 DEFine PROCedure CFILL
1960   LET [illegible]
1970   PRINT#2,"FILL ";[illegible]
1980   FILL F
1990   IF w THEN PRINT#4;L;" [illegible]":L=L+10
2000   FOR V=1 TO 300:NEXT V
2010   CLS#2
2020 END DEFine
2030 REMark
2040 DEFine PROCedure CCLS
2050   CLS
2060   IF w THEN PRINT#4;L;" CLS":L=L+10
2070   CROSS X,Y
2080 END DEFine
2090 REMark
2100 DEFine PROCedure CHECK
2110   PRINT#2,"[illegible]"
2120   PRINT#2,"BLACK [illegible]" [illegible] THEN GO TO 2130
2130   PRINT#2,"BLUE [illegible]" [illegible] THEN GO TO 2140
2140   PRINT#2,"RED [illegible]" [illegible] THEN GO TO 2150
2150   PRINT#2,"MAGENTA [illegible]" [illegible] THEN GO TO 2160
2160   PRINT#2,"GREEN [illegible]" [illegible] THEN GO TO 2170
2170   PRINT#2,"CYAN [illegible]" [illegible] THEN GO TO 2180
2180   PRINT#2,"YELLOW [illegible]" [illegible] THEN GO TO 2190
2190   PRINT#2,"WHITE [illegible]" [illegible] THEN GO TO 2200
2200   CLS#2
2210   CROSS X,Y:[illegible]
2220   IF w THEN PRINT#4;L;" [illegible]"
2230 END DEFine
2240 REMark
2250 DEFine PROCedure CHECK
2260   CLS#2:PRINT#2,"[illegible]"
[illegible]
2270   [illegible] THEN GO TO 2250
2280   CLS#2:PRINT#2,"[illegible]" THEN GO TO 2250
2290   IF a$<>"y" AND a$<>"Y" THEN GO TO 2280
2300   PAPER#2,2:CLS#2:INPUT#2,"PUT TAPE IN MDV2 THEN PRESS ENTER ";a$:PAPER#2,7:CLS#2
2310   CROSS X,Y
2320   SBYTES mdv2_sc,131072,32768
2330   CLS:CLS#2
2340   INK 7
2350   INK 4:PRINT#0,"          INSTRUCTIONS":INK 7
2360   PRINT#0,"B  CHANGE BORDER"
2370   PRINT#0,"I  CHANGE INK"
2380   PRINT#0,"P  CHANGE PAPER"
2390   PRINT#0,"S  CHANGE CURSOR SPEED"
2400   PRINT#0,"F  PLOT ON/OFF"
2410   PRINT#0,"Y  FILL ON/OFF"
2420   PRINT#0,"A  POSITION START AND FINISH OF ARC"
2430   PRINT#0,"C  DRAW CIRCLE"
2440   PRINT#0,"E  DRAW ELLIPSE"
2450   PRINT#0,"L  POSITION START AND FINISH OF LINE"
2460   PRINT#0,"H  SHOW THESE INSTRUCTIONS"
2470   PRINT#0,"Q  QUIT"
2480   PRINT#0,"D  CLEAR SCREEN"
2490   PRINT#0,"R  RECOLOUR SCREEN"
2500   PRINT#0,"T  ENTER TEXT AT CURSOR POSITION"
2510   PRINT#0,"W  OPEN PROGRAM FILE/STOP WRITING"
2520   PRINT#0,"N  SPRAY GUN ON/OFF"
2530   PRINT#0,"F1 SAVE SCREEN TO MDV2"
2540   PRINT#0,"F2 LOAD SCREEN FROM MDV2"
2550   PRINT#0,"F3 INCREASE RADIUS OF GUN (0-40)"
2560   PRINT#0,"F4 CHANGE MODE"
2570   PRINT#0,"USE CURSOR KEYS TO MOVE CROSS"
2580   IF amp=0 THEN CLS#0:GO TO 2600
2590   AT#2,0,0:PAPER#2,2:INPUT#2,"PRESS ENTER TO CONTINUE ";a$:PAPER#2,7
2600   IF amp=1 THEN SETUP_SCREEN:END DEFine
2610   LBYTES mdv2_sc,131072
2620   DELETE mdv2_sc
2630   PRINT#2,"INK:";:PAPER#2,I:PRINT#2,"   ";:PAPER#2,7:PRINT#2," PAPER:";:PAPER#2,PA;
2640   PRINT#2,"   ";:PAPER#2,7:PRINT#2,"  ";[illegible]
[illegible]:CROSS X,Y:CLS#2
2650 END DEFine
2660 REMark
2670 DEFine PROCedure CSAVE
2680   CLS#2:PRINT#2,"SAVE TO MDV2  ENTER NAME":INPUT#2;n$
2690   IF LEN(n$)>10 OR LEN(n$)=0 THEN GO TO 2680
2700   PAPER#2,0:PAPER#2,0:BORDER#2,0,0:BORDER#2,0,0:CLS#2:CLS#2
2710   CROSS X,Y
2720   SBYTES mdv2_&n$,131072,32768
2730   PAPER#2,7:PAPER#2,7:BORDER#2,1,7:BORDER#2,1,7:CLS#2:CLS#2:CROSS X,Y
2740   IF w THEN PRINT#4;L;" SBYTES mdv2_";n$;",131072,32768":L=L+10
2750   PRINT#2,"INK:";:PAPER#2,I:PRINT#2,"   ";:PAPER#2,7:PRINT#2," PAPER:";
2760   PAPER#2,PA:PRINT#2,"   ";:PAPER#2,7:PRINT#2,"  ";[illegible]
2770 END DEFine
2780 REMark
2790 DEFine PROCedure CLOAD
2800   CLS#2:PRINT#2,"LOAD MDV2, ENTER NAME":INPUT#2;n$
2810   IF LEN(n$)>10 OR LEN(n$)=0 THEN GO TO 2800
2820   LBYTES mdv2_&n$,131072
2830   IF w THEN PRINT#4;L;" LBYTES mdv2_";n$;",131072":L=L+10
2840   BORDER#2,1,7:BORDER#2,1,7:CROSS X,Y
2850   PRINT#2,"INK:";:PAPER#2,I:PRINT#2,"   ";:PAPER#2,7:PRINT#2," PAPER:";
2860   PAPER#2,PA:PRINT#2,"   ";:PAPER#2,7:PRINT#2,"  ";[illegible]:CLS#2
2870 END DEFine
2880 REMark
2890 DEFine PROCedure QUIT
2900   IF w=1 THEN CLOSE#4
2910   CLS#2
2920   STOP
2930 END DEFine
2940 REMark
2950 DEFine PROCedure SPRAY
2960   IF D=1 AND KEYROW(1)[illegible] THEN GO TO 2990
2970   IF KEYROW(1)[illegible] THEN GO TO 2940
2980   D=NOT D
2990   FILL 0:OVER [illegible]:CIRCLE X,Y,RR:OVER 0:FILL [illegible]
[illegible]
3000   FOR F=1 TO 10
3010     POINT [illegible]
3020     IF w THEN PRINT#4;L;" POINT [illegible]"
[illegible]
3030   END FOR F
3040 END DEFine
3050 REMark
3060 DEFine PROCedure RADIUS
3070   REPeat CV
3080     IF D=1 OR KEYROW(1)=8 THEN EXIT CV
3090     OVER -1:INK 7:CIRCLE X,Y,RR:[illegible]
[illegible]
3100     CIRCLE X,Y,RR:OVER 0:INK I
3110   END REPeat CV
3120 END DEFine
3130 REMark
3140 DEFine PROCedure mode
3150   [illegible]
3160   IF w THEN PRINT#4;L;" MODE ";[illegible]:L=L+10
3170   SETUP_SCREEN
3180 END DEFine
3190 REMark
3200 DEFine PROCedure write
3210   w=NOT w
3220   IF w=1 THEN
3230     CLS#2:INPUT#2,"Place tape in mdv2, then press ENTER ";a$:CLS#2
3240     PRINT#2,"Enter name of file: ":INPUT#2;n$
3250     IF LEN(n$)>10 OR LEN(n$)=0 THEN GO TO 3230
3260     CLS#2:CLS#2:PRINT#2,"INK:";:PAPER#2,I:PRINT#2,"   ";
3270     PAPER#2,PA:PRINT#2,"   ";:PAPER#2,7:PRINT#2,"  ";[illegible]
3280     OPEN_NEW #4,mdv2_&n$
3290     PRINT#4;"10 MODE ";[illegible]:L=20
3300     PRINT#4;"20 WINDOW [illegible]"
3310   ELSE
3320     PRINT#2,"Writing [illegible]":CLS#2
3330   END IF
3340 END DEFine
3350 REMark
3360 DEFine PROCedure border
3370   CROSS X,Y
3380   INPUT#2,"Width ? ";[illegible]:IF NOT [illegible] THEN GO TO 3380
3390   INPUT#2,"Colour ? ";[illegible]:IF NOT [illegible] THEN GO TO 3390
3400   CLS#2
3410   BORDER [illegible]
3420   IF w THEN PRINT#4;L;" BORDER [illegible]"
3430   CROSS X,Y
3440 END DEFine
3450 REMark
3460 DEFine FuNction check(a$)
3470   IF LEN(a$)=0 THEN RETurn 0
3480   FOR F=1 TO LEN(a$)
3490     IF (a$(F)<"0" OR a$(F)>"9") [illegible] THEN RETurn 0
3500   END FOR F
3510   RETurn 1
3520 END DEFine check
```

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Function key

on Vic 20

This machine code program is inserted into the Vic 20's 60 Hz interrupt request routine and programs the four function keys on the right hand side of the Vic. The code is inserted into the 94 free bytes from 673 to 767 (decimal) and thus does not cause a reduction in user Basic memory. The code is entered using a Basic loading program with the machine code contained in *Data* statements. It has been set up to print the following four commands to the screen.

Run (F1), *Poke* (F3), *?P-(* (F5), *List* (F7).

These can be changed (as long as they do not exceed four characters long) by changing the screen *Poke* codes in the data from Line 150 upwards.

When you have typed in the program *Save* it, as the Basic loading program erases itself after running. To disable the function keys, press *run/stop* and *restore* together. To re-enable the keys type *SYS(673)* and carriage return.

```
1 REM ****************
2 REM * -FUNCTION--- *
3 REM * -KEY-WEDGE-- *
4 REM * -G.HATTO-    *
5 REM ****************
10 FORI=673TO767
20 READA:POKEI,A:NEXT
30 PRINT"█████  FUNCTION KEYS  "
40 PRINT"█████ F1 ██ = RUN"
50 PRINT"█████ F3 ██ = POKE"
60 PRINT"█████ F5 ██ = ?P-<"
70 PRINT"█████ F7 ██ = LIST"
80 PRINT"████    [SYS(673)]    █"
90 SYS(673):NEW
100 DATA 120,160,174,141,20,3,169,2
,141,21,3,88,96
110 DATA 160,0,165,197
120 DATA 201,39,240,17,200,201,47,
240,12,200,201,55,240,7,200,201,63
,240,2,200,30
130 DATA 152,24,42,42,160,162,0,185
,240,2,157,229,31,232,200,224,4,200
,244
140 DATA 173,134,2,160,0,153,229,15
1,200,192,5,200,248,162,22,24,32,
240,255,76,191,234
150 DATA 15,21,14,32:REM "RUN "
160 DATA 16,15,11,5:REM "POKE"
170 DATA 63,16,69,40:REM "?P-<"
180 DATA 12,9,19,20:REM "LIST"
```

Function key
by G Hatto

The Music Box

Chord construction

I've received a long – and no less welcome for that – letter from D. Tatam of Oxford, who owns an Amstrad CPC 464 and has some general queries and comments.

Tatam (Mr or Ms?) asks for help in a number of areas and would also like to correspond with other musical Amstrad owners. Currently, my correspondent is writing what sounds like a step-time sequencer for the Amstrad. I will, of course, pass on any letter sent to the column.

As far as the queries go, none are really specific to the Amstrad. The first is about the availability of literature giving accurate ADSR shapes and timings for musical envelopes. The brief answer is that no such literature exists which would be of much use to computer musicians.

Acoustic envelopes are inordinately complex and the ADSR convention is merely a convenient simplification. Not only are the characteristic attack, decay and release rates of given instruments complicated in themselves, but they are also subject to variation with frequency, playing style and, indeed, the environment in which the music is heard. You can get the best picture of actual envelopes if you have access to a digital storage oscilloscope fed from a high quality microphone and preamplifier. For those who don't have this facility, the best advice is to experiment. Almost any primer on electronic music will give you some idea of where to start – sharp attack for percussive instruments, sharp release and gentle attack for woodwinds, and so on. After that, it's up to you.

The column would be most interested to receive ADSR settings for any computer (as long as you specify which one) that readers have produced and found to be particularly interesting.

A second query in Tatam's letter asks which are the most important notes in a chord, so that – for example – a three-voice arrangement will not come amiss. Here again, the answer is complex (in fact, an introduction to the theory of harmony would be required). The simplest response would be that it depends where the melody is going. Almost invariably, the most important note in a chord is the root or tonic (after which the chord is named). The fifth, or dominant, note (for example, G in C chords) is often omitted in four part harmony written for three parts or indeed in three part harmony (when the bass note is sometimes doubled). In general, one should include the note that gives a chord its particular flavour (for example, the F in a chord of G7 – F being the seventh in the key of G) as well as the tonic. Usually, keep the third (or, for minors, the flattened third) as well.

In this case, any music theory text book or a good Dictionary of Music (I recommend Collins Encyclopaedia of Music) should help. Once again, any readers with tips or more advice (as well as ADSR settings and examples of their music) are more than welcome to write in.

Gary Herman

The Music Box is a weekly column with news, reviews and readers comments on all aspects of micros and music.

Any readers with experience of computer music making or companies with new product news are invited to write to drop a line explaining what they're doing to Gary Herman, The Music Box, 12-13 Little Newport Street, London WC2R 3LD.

Open Forum

Namsort

on QL

SuperBasic is a powerful language but it has two drawbacks. It makes heavy demands on RAM and it is very, very slow. This is only too evident when one attempts a compute bound task such as sorting data into order. A *Sort* procedure is given in the QL User Guide

The procedure *Namsort* below makes minimum demands on storage space and uses a much more efficient algorithm. For the same sort of 1000 random numbers it took only 5 mins, 52 secs over 12 times faster – still a long time but probably about as well as can be done in SuperBasic A machine language procedure might be expected to give a further order of magnitude improvement.

One advantage of *Namsort* is that it will work with any type of data – string, floating point or integer Since the array name is the argument of the procedure, its type need not be declared as it will take on the type of the array used in the call. The data to be sorted is a(1) . . a(n) and *n* – the number of items to be sorted must be put in a(0)

The *Test* program shows how to use the routine to sort 100 random numbers and prints out the time taken in seconds

```
100 REMark namsort - an efficient internal sort
 for any type of array.
110 REMark Norman A. Macleod 1984
120 REMark A reasonably efficient procedure to
 sort the elements of 130 REMark an array in place
 into ascending order. The array may be 140 REMark
 integer, floating point or string.  The elements
 sorted are 150 REMark a(1)...a(n).  Set a(0)=n,
 the number of items to be sorted.
160 DEFine PROCedure namsort(a)
170 LOCal i, j, k, m, n
180 n=a(0): i=1
190 REPeat start: i=i+1: IF i>n THEN EXIT start
200 m=i-1
210 REPeat loop
220 m=m DIV 2:  IF m=0  THEN EXIT loop
230 k=n-m
240 FOR j=1 to k
250 i=j
260 IF a(i+m)< a(i) THEN
270 a(0)=a(i): a(i)=a(i+m): a(i+m)=a(0)
280 IF i>m THEN  i=i-m: GO TO 260
290 END IF: END FOR j: END REPeat loop
300 a(0)=n
310 END DEFine namsort
320 :
330 :
340 REMark TEST program to sort 100 random numbers
350 REMark and print out the time taken in seconds.
360 DIM x(100)
370 FOR i=1 to 100: x(i)=RND(1000)
380 x(0)=100: CLS: PRINT \, x !
390 y=DATE
400 namsort x
410 PRINT \, \, x ! ,\ , DATE-y, "seconds"
```

Namsort
by N Macleod

Arcade Avenue

Poke galore

This week we start with a couple of pleas for help – every so often an Adventure Helpline form gets passed on to me by the powers that be when the game in question is deemed to be more arcade than adventure. Of course it's getting increasingly difficult to decide how to divide some of the games up, *Tir Na Nog* being a particularly thorny example, but I feel that a good guideline is that if it relies more on reaction skills than deduction and if it avoids text input it should be called an arcade game Hence the question from 'John' of Hove who wants to know how to get the key off the moon in *Pyjamarama* – to be honest John if you've got to the moon and opened the door by using the magnet, as you say, then all you should have to do is jump up the platforms and get the key D Fuller of Durham can't get to the moon in the same game – take the BP can, fill it at the box marked 'fuel' and take it to the rocket.

Mr and Mrs Ferguson of Ashford want to know how to get past the 'faces' and the 'snakes' in *Quo Vadis* which is one that I'm going to have to throw out to our readers

It seems that a lot of people are having trouble getting the Monty Mole Poke to work I'm sorry if this does happen, we really don't get time to check every *Poke* we are sent in Anyway, our old friend Le Page Said of Brussels comes to the rescue with a superb letter full of *Pokes*, including some for Monty printed below, and the listing above to put *Penetrator* landscapes onto microdrive Incidentally, Michael Kohut of Leeds, these pokes do work if you insert them just before the Randomise statement of the Basic loader so unless you have a different version of the game you should have no problems with the headerless block of code you mentioned However, Michael points out that our *Sabre Wulf* Pokes seem to have gone astray before printing I promise to try and find them and print the infinite lives again but meanwhile *Poke* 39702, 30 to make it a lot easier. Anyway here is Le Page's tips – "*Monty Mole*" *Poke* 36004,0 endless lives, *Poke* 36301,201 gets rid of crushers, *Poke* 35874,255 lets you fall from any height *Pinballed* *Poke* 48441,0 endless lives, *Lunar Jetman* *Poke* 36965,0 endless lives, *Poke* 37999,201 no enemies, *Poke* 43092 x-1 selects level where x<99 *Underwurlde* *Poke* 39375,0 endless lives, *Poke* 45019,201 gets rid of moving enemy *Knight Lore* *Poke* 53867,0 endless lives (thanks also to Chris Allen of Woodbridge for this one), *Poke* 50084,201 no metamorphosis and endless days (all the above Ultimate *Pokes* also need *Poke* 23756,1 to make the header editable) *Moon Alert* *Poke* 39754,0 endless lives *Poke* 37035,201 gives no enemies in the air, *Poke* 42654,195 gives immortality More *Pokes* next week

Tony Kendle

Games Wizard Competition

Play the games, send in your high scores on the form and you could become The Games Wizard

	Commodore	BBC	Spectrum	Amstrad
Game 1	Suicide Express	Elite	Technician Ted	Sorcery
Game 2	Beach Head	Jet Pac	3D Star Strike	Splat
Game 3	Shoot the Rapids	Chuckie Egg	Cyclone	Manic Miner

Game Wizard Entry Form

Micro

Game 1 score

Game 2 score

Game 3 score

Name

Address

Your signature

Witness's signature

Tape Copy

on Dragon

Because users may want to modify and look at commercially available machine code routines and programs I wrote the following machine code program to make back up copies of machine code programs including those which auto-start

The program resides at memory locations 32400 to 32656

To save the program type in the Basic program and *Run* it Save the machine code using CSAVEM "COPIER", 32400, 32656, 32415

When you need to use the program type *Clear O* then load the previously saved machine code with *CloadM Exec* will then have to be typed to start the copier program.

If there is more than one part to the machine code, each part must be copied separately The copier program can copy most machine code programs up to 31½K.

```
1 CLEAR100,32399
10 DATA 126,159,0,10,153,77,58,164,51,50,52,51,57,0,0,141
20 DATA 108,142,127,79,16,142,5,224,141,112,142,126,144,159,25,142
30 DATA 126,160,159,27,126,133,165,142,5,224,16,142,127,143,141,101
40 DATA 142,127,47,16,142,5,224,141,81,189,128,6,129,13,38,249
50 DATA 190,1,231,140,5,254,34,9,142,127,143,16,142,5,224,141
60 DATA 57,142,126,249,57,16,190,1,231,52,16,158,126,48,31,52
70 DATA 16,190,1,229,52,16,126,153,27,142,127,111,16,142,5,224
80 DATA 141,24,189,128,6,39,251,129,89,39,181,32,146,142,4,0
90 DATA 134,32,167,128,140,6,0,38,249,57,166,128,167,160,16,140
100 DATA 6,0,38,246,57,166,128,167,160,140,6,0,38,247,57,83
110 DATA 84,65,82,84,32,82,69,67,79,82,68,73,78,71,32,84
120 DATA 77,69,78,32,72,73,84,32,69,78,84,69,82,32,32,80
130 DATA 82,69,83,83,32,80,76,65,89,32,79,78,32,84,72,69
140 DATA 32,84,65,80,69,32,82,69,67,79,82,68,69,82,32,68
150 DATA 79,32,89,79,85,32,87,65,78,84,32,65,78,79,84,72
160 DATA 69,82,32,67,79,80,89,32,63,32,40,89,47,78,41,0
170 DATA 0
180 FOR A=32400 TO 32656
190 READ B
200 POKE A,B
210 NEXT A


RUN THE PROGRAM ABOVE THEN SAVE THE MACHINE CODE BY TYPING

CSAVEM "COPIER" ,32400,32656,32415
```

Book Ends

Book *Games For Your Sinclair QL* **Price** £2.95 **Micro** Sinclair QL **Supplier** Virgin Books Ltd, 61-63 Portobello Road London W11 3DD

Will somebody explain to me why anybody who has bought a QL should want to type in a program that will turn into a clock? And when they forked out £400 was it really to be able to play 'Rock – Scissors – Paper' against a microprocessor?

Admittedly the world hasn't been submerged by QL software, but type in listings aren't going to stretch this machine to its limits, unless they're of considerable length and probably include some machine code These are mostly short and trivial, presumably because more ambitious listings don't sell, Catch 22.

There are, however, a small handful that might make such a low priced book worthwhile if you're desperate for some Basic feed to your ravenous QL

John Minson

Book *An Amstrad CPC464 Compendium* **Price** £7.95 **Micro** Amstrad CPC464 **Supplier** Addison - Wesley Publishers Ltd Finchampstead Road, Wokingham Berkshire RG11 2NZ.

'Compendium (n) A summary " of listings in this case, which is sad because a compendium of programming techniques could be far more valuable.

However, not all listings books are equal and some writers have realised that doing more than reproduce print-outs improves their offerings. In its favour this one starts with a brief introduction to the micro's graphic and sound capabilities, with programs to demonstrate these

After which it's back to the usual compilation, though without the worst space-fillers All the programs are well laid out with plenty of Rems, but also some mis-spellings It's not a cheap book but of its kind it's better than average

John Minson

Book *The Bytes Brothers Record a Robbery* **Price** £1.95 **Micro** Any **Supplier** Armada, Fontana Paperbacks, 8 Grafton Street, London W1X 3LA.

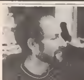
The Bytes Brothers are two precocious American youngsters who solve mysteries with the aid of their computer – sort of the Hardy Boys with chips – and this is the fifth of their adventures for the junior market

I like the concept of urging the readers to use their micros as part of the story, it encourages hands-on experience and demonstrates practical application. It's also good that there's a micro-mad girl who doesn't play a secondary role as well.

However, the brevity of the five puzzles in this volume reduces suspense and over-emphasises their pro-micro propaganda aspect. None of the mysteries are really mysterious enough and the style may be jarringly American for some Still, the book is cheap enough to try out on any Sherlock Juniors

John Minson

Tony Bridge's Adventure Corner



Eureka!

Having very quickly mentioned *Jewels of Babylon* (Interceptor Micros) last week, The Grand Elf has received his first plea for help in the adventure. Gary Wilson tells me 'The object of the adventure is to recover the jewels from pirates who have a secret hide-out on an island. I think that the locked door is the entrance to the hide-out on an island. I think that the locked door is the entrance to the hide-out as there are many pirates guarding the surrounding caves. When I try *Open Door* the reply: you have *no key*. I have travelled everywhere possible in the rest of the adventure and found no key. I have tried breaking the door down and even knocked on it, but to no avail. I would also appreciate some advice on Foilkade's *Adventure 300* which is also available for the ZX81 and BBC (as well as the Spectrum). Please put me in touch with anyone who is interested in this adventure, no matter how far along they are.'

As far as that jewel goes, Gary, you have either not explored every location thoroughly enough, or, as you think, there is something else to be tried. It's tempting to think that Interceptor haven't fallen for the boring old key routine here – maybe someone can write to Gary with a nudge in the right direction? As for the *300* adventure, I hadn't realised that this was still available, having seen it on the ZX81 about a thousand years ago. It was a good traditional game, with lots of atmospheric descriptions for the 200 locations. Unfortunately I have lost my notes and solution – can someone enlighten us? Gary's address is: 36 Rockwood Crescent, Woodhall Park, Pudsey, West Yorkshire LS28 5AE.

Another adventure about which we need help is the Commodore adventure-with-a-book, *Spirit of the Stones*. The incentive for buying this particular one was a prize for the first person to finish the game. This prize consists of 40 (count 'em!) small diamonds hidden (not buried) around the Isle of Wight, together with a much larger stone, the Great Wight Eye.

P A Graham is unable to make a start on deciphering the Runes – have a look at the inside cover of the book, P A, where you'll be given, I reckon, three free clues! If you want another opponent (a little unlikely I would have thought!), then drop him a line. Also, *Ring of Power* is causing Mr (?) Graham some trouble – particularly filling the hole in the boat, and returning in the lift. Write to him at: 186 Heneage Road, Great Grimsby DN32 9JF.

On to *Eureka!* (their exclamation, not mine). Those among you with exquisite taste will no doubt subscribe to *MicroAdventurer*, and if not, then why not? In the issue of January, you will have read my opinion of this adventure, which, I have to say again, is not very high. There's no denying, of course, that the lure of £25,000 will prove irresistible to many thousands of otherwise sane adventurers, and I can find nothing wrong in that. But.

To summarise my review very briefly, I think that the 'arcade' games which precede each adventure are mind-numbingly boring and add nothing to the atmosphere of enjoyment of the adventure that follows. They are there to help you gain more 'energy' which is depleted as you engage in combat in the adventure – and that in itself is not a bad thing, but the sheer unplayability and confusion displayed by these minor fiascos make the adverts for routines enabling the player to bypass them very worthwhile and well worth investing in. What I don't really understand (and I'm trying to, believe me) is how those responsible can call this the ultimate in graphics and 'sophisticated software'. Did Ultimate and all the others *really* toil hour after man-hour for this? But the adventures, when finally encountered, are – well, okay, I suppose. Not the towering achievement that the adverts will have led you to believe, but, judging by the letters I've received (only a handful) they are of average toughness. The adventure is not the whole story here, as the pictures in the booklet, apparently, must be decoded along with the adventures themselves, before a solution is found, and the huge prize claimed.

Gary Candido is working on *Eureka* at the moment, and has a few problems. 'Prehistoric: I have the Crystal, Sulphur, Stone etc, but how do I use them to combat the rampaging Dinosaur? Roman: I have the Leper's Skull, Swamprose, Dragon's Tooth and Golden Eagle. I gave them all to the Witch along with the Lucky Charm. I got a Foul Potion – if I drink this, I'm dead! What *now*? Arthurian: How do I capture the Questing Beast and do I need to donate anything special to the Church? How do I get to the conical Hill by the Monk's Abbey?'

In the Prehistoric adventure, Gary, I think you must read up on Gunpowder making, and find a Hollow Bone – then you might be able to fell the Dinosaur with a bullet. Gary has completed a lot of the other adventures, including *The Hobbit*, *Sherlock*, *Valhalla* and more and can offer help in all these. Write to him at 216 Brettel Lane, Stourbridge, West Midlands DY8 4BG.

Another person who is asking for help in this game is Mick Holdman. He's having trouble with that *@!£ Brachiosaurus and, in the Roman adventure, can't get further than sailing around on the raft. His address is (and anyone who can give him a rundown on Scott Adams' *Hulk* might also drop him a line): 177 Sheridan Street, Leicester LE2 7NH.

Meanwhile, Stuart Lorimer cannot enter the army camp in the Roman episode, as the guard refuses to let him in, and in Colditz, he keeps getting blown to pieces in the minefield. As for the Modern Caribbean adventure, he can't find the access code in the computer room. He is, though, close to completing Parts 1 and 3, and is happy to offer hints on them.

While on the subject of help, don't be afraid to write to the software houses concerned if you are stuck in one of their adventures. They want your continued custom, and many of them run quite efficient services. The best of them is, as befits the quality of their programs, Level 9, but most of the others are only too happy to help – just remember to write and enclose the SAE for the reply.

Adventure Helpline

Going bananas? If you are stuck in an Adventure with nowhere to turn do not despair – help is at hand.

Fill in the coupon explaining your problem, send it to us and a fellow adventurer may be able to help.

Remember – the system only works if those adventurers who have solved the puzzles get in touch. Every week is Save An Adventurer Today (SAAT) week!

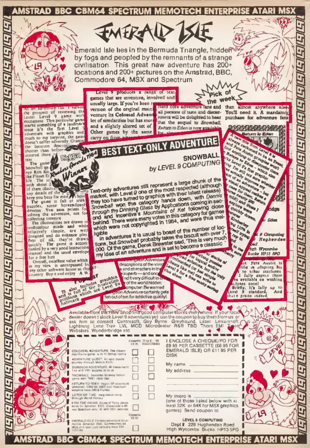
Adventure .... on (Micro) ....

Problem ....

Name ....

Address ....

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed or if you are stuck in an Adventure you cannot progress any further write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.


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Pick of the week
BEST TEXT-ONLY ADVENTURE
SNOWBALL
by LEVEL 9 COMPUTING
Text-only adventures still represent a large chunk of the market, with Level 9 one of the most respected (although they too have turned to graphics with their latest release) Snowball won this category hands down, with Dennis through the Drinking Glass by Applications coming in second and Incentive's Mountains of Ket following close behind There were many votes in this category for games which were not copyrighted in 1984, and were thus ineligible
In adventures it is usual to boast of the number of locations, but Snowball probably takes the biscuit with over 7,000 Of the game, Derek Brewster said, 'This is very much my idea of an adventure and is set to become a classic'
Available from the HMV Shop and good computer stores everywhere If your local dealer doesn't stock Level 9 adventures yet use the coupon to buy them from us or ask him to contact Centresoft, Gay Byrne Greyhound Lazer Leisuresoft Lightning Lime Tree LVL MCD Microdealer R&R TBD Thorn EMI Tiger Websters Wonderbridge etc
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Peek & Poke



Ms Spectrum?

Mike Day of St Peter Port, Guernsey, Channel Islands, writes

Q **I saw your answer to PCW Vol 3 No 49 to the question of how to tell an issue 3 Spectrum from the earlier issues. This can be told from looking at the expansion port. Issue 3 ones have a large heat sink just inside the port clearly visible, earlier issues have the heat sink in a different position further down inside the machine, and it is not very visible. Please may I make a plea to the readers of your page.**

Could anyone who has built and got working a Maplin modem, please contact me, my telephone number is 0481 26168.

A Can I make a final desperate plea to all the readers of this page (both of you) can we now consider the question of 'sexing' a Spectrum a closed book! As far as the second point goes surely someone, somewhere must have built and used a Maplin modem

Spectrum error trap

Robert Brown of Bedlington, Northumberland, writes:

Q **I own a 48K Spectrum and a microdrive. I have written a program which is a database and uses the microdrive. Please can you tell me if there is a program which will compact my database program giving me more room for records?**

Also, could you tell me if it is possible to trap errors on the the Spectrum within Basic.

If I bought a book and it had a routine in it that I really needed and I included it in my program, would it infringe the copyright of the routine if my program was published in a magazine or on Micronet?

A I'm not quite sure whether you want something that will compress your program or your database If your program is written in Basic then a compiler will do the trick for you As far as the database is concerned then you will have to learn the tricks of the trade regarding data compression techniques Your local library will be able to help you there There is a system variable ERR SP which you can set to an address of your own, this will enable you to trap any errors, there is another system variable which contains the error report code that has produced the jump to the error routine

As far as your last point is concerned, publishing someone else's routine as part of the program of yours would undoubtedly infringe copyright

However using someone else's ideas is not infringing copyright, so if you see a routine that you need, see how it could be improved, try refining it to run faster, make it your own

Sinclair spare parts

M J Baker of Telford Electronics, Inside Bamvare Mall 4, Telford Town Centre, Shropshire TF3 4DG writes

Q **As you rightly pointed out in your column recently, Sinclair Research discourage (to put it mildly) companies advertising Sinclair spare parts to the public.**

So it is highly unfair that you repeatedly publicise that RA Electronics of Lowestoft are willing to ignore the 'ban', when dozens of companies like ourselves would love to be able to supply keyboard membranes and other spares.

Perhaps you could add to your file that we are willing to repair Spectrum keyboards for £12 and ZX81 keyboards for £8 inclusive. The machine has to be sent to us since we are forbidden to advertise our self-repair kits for the Spectrum, which incidentally retail at £10 inclusive.

A Sorry if I have offended you Mr Baker. I honestly did not know of your company's facilities. I hope that by publishing your almost completely unedited letter that this goes some way towards making amends. You never know, perhaps the last word on your facilities will now go around!

Joining up

Neil Varden of Leicester, writes:

Q **I own a 48K Spectrum and am thinking of getting a modem. I have narrowed the choice down to two, Protek and the Prism VTX 5000, but have a few queries about them. I know you need a telephone for the Protek, but as the Prism plugs into a modem telephone socket can you get away with just the socket and no telephone? And when I get my system will I be able to use Prestel and Micronet straight away or will I have to subscribe to these systems? In other words are they free?**

A You correctly say that you do not need a telephone for the Prism. It has software that actually dials the required number for you

You will be able to use Prestel and Micronet immediately, but not all the facilities, the rest you will have to pay for the privilege of using Therefore it would be fair to say that neither system is actually completely free, but at least you will be able to sample their wares before you part with your money

ZX81 conversion

D E Hobbs of Northolt, Middlesex, writes:

Q ***I have a problem that I hope you can help me with. I have a ZX81 for which I have several programs that I would like to convert to run on a Spectrum. As I am not terribly good at programming can you tell me if there is a ready made program enabling me to do this conversion without having to completely re-type the programs.***

My other problem is that three programs that I have for the Spectrum, namely *Olympia*, *Chequered Flag* and *Velnor's Lair* will not run with Interface 1 connected I hope you can help me.

A There are programs which enable ZX81 programs run on a Spectrum, however, they do not convert all ZX81 programs successfully It may well be that you will have to manually convert the programs yourself

Any machine code will almost certainly have to be recoded, as it is likely that the memory addresses will be incorrect.

The point you make about Interface 1 is a good one and one that has cropped up before

My only advice is that you write to the manufacturers of the games concerned and ask them for the required amendments to enable you to run these games successfully

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Phil Rogers and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke*, *PCW*, 12-13 Little Newport Street, London WC2R 3LD

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WANTED letter quality printer and Spectrum Interface will swap collection of over 100 S F magazines of the 1950s Astounding etc Tel Thanet 284626

WANTED printer suitable BBC computer also modem Prices to advertiser 302 Langland Road Netherfield Milton Keynes MK6 4HY

WANTED cheap Alphacom printer for Spectrum also Sinclair speech control required both must be in superb condition and working order Also original Spectrum software wanted Tel 0763 61382.

SPECCY OWNERS! do you want some extra cash? Got a Sinclair speech control lol? Yes! Tel Viv on 0763 61382 who will probably buy it off you Phone before someone else does!

ZX81 with 16K RAM pack + graphics ROM + VDG Swap for interface 1 + microdrive Telephone Lowestoft 751532

SWAP Amstrad + RGB VDU + tapes for BBC B in PWO Will pay postage of monitor if Acorn DFS included or sell for £320 Write to D Scott 290 Harden Place Hawick Roxburghshire TD6 7BY

SWAP 48K Spectrum for Atari 800XL or swap for almost anything Tel St Helens (0744) 815076 any time

WANTED broken Spectrum 16K or 48K must be cheap Keyboard not important but circuit board must be complete Tel 0481 26166

WANTED Jupiter Ace No bills needed except possibly the expansion pack Must be working perfectly and have all manuals I will pay postage Stevenson Tel 06527 337 after 6pm

WANTED Hewlett Packard Prof calculators HP15C and HP16C will offer cash for best quotations Dale Tel 465 4808 any time

WANTED ALPHACOM 32 printer will swap for Currah Microspeech Sherlock Knight Lore Underwurlde and Adventure Quest Tel 0228 382487 after 4pm and ask for Rick

Spectrums for Sale

ZX SPECTRUM Lots of S/W and H/W for sale also some ZX81 H/W and S/W for sale Tel 0272 509754 after 6pm

48K SPECTRUM with Cheetah keyboard Rotronics Wafadrive Alphacom 32 printer Currah microspeech S/W 10 computer books Cost £700 sell £350 or swap for QL Brian Tel Bangor 460148 (N Ireland)

SPECTRUM SOFTWARE Night Gunner £4.50 Pool £3 3D Desert Patrol £2 Transylvanian Tower £3.50 3D Deep Space (with 3D glasses) £5. Martin Tel 01 534 3260 after 6pm

SPECTRUM 48K original software Winged Warlords Clerky 3D Bat Attack Conquest £5 the lot Tel Rotherham 70148

SPECTRUM SOFTWARE originals as new Sherlock £7 Valhalla £3 Count with Oliver £3 Clever Clogs Sam Safety £3 Party Time £3 Caesar the Cat £3 Write R Wells 1 Daffodil Avenue Brentwood Essex

48K SPECTRUM Brand new 1 week old issue 4 £100 no offers Tony Tel 01-388 0839 (eves)

48K SPECTRUM + Over £350 of original S/W No copies Dust cover magazines worth over £450 accept £200 Gary Name 98 Tamworth Rd Hove Sussex

48K SPECTRUM fuller keyboard Kempston Centronics interface Cassette player books software £95 Tel Leeds 752718

BARGAIN SPECTRUM 48K to update to Spectrum+ (three months old) Turbo interface and Quickshot II £400 Software (games languages utilities educational) books and magazines £185 Tel 01 942 5787

SPECTRUM S/W originals Krakatoa Holy Grail Blade Alley Stop the Express Missile Defence Jetpac Pioneer Beach head Mr Wimpy Spawn of Evil Espionage Island £32 the lot or will split 0630 3530 after 6pm

VIC 20 + C2N cassette player + books £47 ono Also 2 cartridges Tel 061 483 3810

CBM 64 software for sale less than half price PSI Warrior Quasimodo's Revenge God-Cam Warrior + others Send SAE for list to P Carrick Kildora Morton Road Brading Isle of Wight.

CBM 64 Data cassette printer plotter £65 worth of software and books £265 Tel 021 771 3227 evenings

CBM 64 FUTURE FINANCE £50 ono Easy File £25 and Intro to Basic £10 all on disc Tel 01 345 2446

SPECTRUM S/W £90 worth inc Harrier Attack Doomsday Castle and many more VGC £80 ono Tel Aston Abbot 8130

48K SPECTRUM DK Tronics keyboard ZX printer Kempston joystick interface Quickshot joystick cassette player S/W books £190 Mark Tel 01 664 5068 after 6.30pm

SPECTRUM SOFTWARE Loads of up to date original programs very good condition secondhand or unused very cheap prices Viv Tel 0763 61382 after 5pm

SPECTRUM SOFTWARE 20 titles worth £130+ including Zeus Assembler Hulk Black Crystal etc £40 Stonechip programmable joystick interface £8 Richard Bennett Tel 09283 3388 (Cheshire)

48K SPECTRUM Two joystick interfaces printer 5 rolls of paper cassette recorder control switch Over £100 worth of software Still under guarantee Will accept £198 ono Mal Tel 047 480 2710

80 SPECTRUM GAMES All originals from £1 each eg Lunar Jetman £3 Pyramid £3 Gulpman £2 Tel Ian Ashford M ddx 44640

SPECTRUM 48K £65 original software Amstrad data recorder nearly new all in worth £250 will sell for £130 Ideal starter pack for the beginner Tel 041 668 7576 after 4pm

Commodores for Sale

CBM 1541 disc drive and Easy Script Diskette box 13 diskettes with programs £175 Tel Luton 589947 before 7pm

CBM 64 for sale inc Quickshot II Joystick The Hobbit Pyjamarama Light Pen and the Duck Staff of Karnath others included All originals and [illegible] Offers Tel 061 733 0030 before 4pm

BARGAIN Vic 20 games Original only all new Half price Light Pen £13 Ram pack £28 Over 60 games Tel 01-848 2356 after 5pm

CBM64 s/w for sale E.G Slinky £5 Spitfire Ace £5 Bak £4 Ancipital £4 TLL £4 Games Creator £7 High Noon £4 Decathlon £4 Tel 0323 661871 after 9pm

CBM 3032, COMMODORE 8K tool kit model 4040 dual disk drive model 4022 tractor feed printer 2 Commodore cassette recorders CBM64 disc S/W inc Flight Simulator + deadline £368 Tel Blandford 56845 any time

CBM VIC 20 + C2N DATA RECORDER 16K switchable RAM pack joystick dust cover £130 of original S/W Six cartridges all as new £88 Tel Hemel Hempstead 48612 (eves)

VIC 20 + JOYSTICK cassette recorder 16K RAM pack Super expander Six computer books two cartridge games Lots of S/W inc Snooker Perils of Willy £90 Tel 01 572 5725

VIC 20, one month old without cassette recorder 16K RAM cartridge Intro to Basic I English revision cassette + nine cassettes games + two cartridges All good condition worth £170 sell for £90 Tel 01 737 0380

CBM 3032 + tool kit + twin T/R + S/W + many books As new £350 Tel 01-788 7128

COMMODORE 64 original software Hornet Scramble Crazy Kong Cuddly Cuburt Revenge Camels Frogger Tu-kon of Ghell bargain £10 the lot Tel 0493 861024

VIC 20 C2N MOTHERBOARD switchable 16K RAM M/C monitor super expander and over £200 worth of software All in good condition Worth £470 accept £250 ono Tel 093 4809 evenings and weekends

CBM 64 S/W no copies inc over 130 titles on cassette disc + RAM inc Calc Result advanced American games + music designer Games from late to latest releases all at 50% to 60% of normal cost Tel 01 748 8179 (after 5pm)

VIC 20 £800 worth of accessories – £100 ono or swap for CBM 64 Tel 061 643 5658

VIC 20 ACCESSORIES 8K Motherboard £17 Intro to Basic I £5.50 Vic Revealed £4 Tel 01 852 6575

CBM PET Stack Control program on disk with manual completely original for 4032 and 4040 machines also works on 3000 series machines accept £17.75 including postage etc. Tel Chamer 675217

VIC 20 + cassette recorder 9 games only £55 Tel Manir 01-340 2356 after 5pm

COMMODORE 64, sell Erik The Viking Return Eden Sorcerer Claymorgue Castle Castle Terror Mystery Munroe Manor Calescmbs Hampstead Twin Kingdom Valley £3.95 Heroes Karn Empire Karn £3.25 Sherlock £6.75 Others Tel 0703 470016

CBM 64 Simons Basic boxed as new £30 Tel 0924 714924

PET COMPUTER £150 ono Tel Andy after 9pm 04862 65978

CBM 64 £180 or swap for a car Tel 04862 65978 Andy Oden Malmsby Holly Bank Road Woking Surrey

VIC 20 with complete starter pack + 16k expansion C2N cassette recorder Quickshot joystick, games Jet pack + Vegas Jackpot Cartridges manuals books & mags £100 Tel 01 550 2650

Acorn for Sale

EIGHT SOCKET Rom board to BBC M micro £20 ono Tel Darby (0332) 560381

BBC O/S 1.2 dma recorder graphics speech and wordwise Rom books with £200 of S/W inc Elite Worth £750 sell £460 also grafpad £85 ono Tel Byfleet (09323) 48304

BBC CURRAH disc drive Forty track doubled sided manual and utilities Disc little used £125 ono Steve Gold Tel Sheffield (0742) 365867

BBC-B O/S 1.2 with data recorder over £120 software 2 programming books and all manuals cables etc £480 ono Tel 03553 2885 (560 2885 Glasgow area) after 6pm or weekends

ELECTRON COMPUTER mini condition including joystick interface joystick computer cassette recorder centronics interface and user port 18 original games + books and accessories cost it new over £400 accept £185 Tel Wakefield 250452

BBC MODEL B + Opus DDOS + graphics Rom + dual double sided disc drive 40T + all leads manuals software etc Will sell for £550 ono Tel Ongar (0277) 362487

BBC CUMANA twin 400K disc drive 40/80 switchable own PSU led manual utilities disc Still guaranteed Only £459 Mr Blake Tel 0246 823464 before 6pm

ELECTRON & BBC TAPE RECORDER – 12 original games (inc Elite and Chucky Egg) plus three books First Byte interface and Joystick mags Cost £400 sell £180 Tel 0642 551049 after 4pm

BBC S/W FOR SALE inc Micropower games adventures arcade and utilities some discs £3.50 Originals only Chris Tel 01 386 7130 after 5pm

ACORN ELECTRON Joystick interface Selection of original S/W Excellent condition £115 Tel 01 253 7372

BBC MICRO disc drive with interface £210 Tel 061 748 9101

BBC-B 1.2 O/S graphics Rom lots of games Best offer around £320 secures Tel Epsom 24136

BBC B 1.2 O/S nine months old VGC plus 2 Beebugsoft Eprom Toolkit and Exmen 2 plus 10 programs £325 ono Tel 07816 5490

BBC B O/S 1.2 with data recorder over £120 software 2 programming books and all manuals cables etc £400 ono Tel 03553 2885 (560 2885 Glasgow area) after 6pm or weekends

ELECTRON COMPUTER mini condition including joystick interface joystick computer cassette recorder centronics interface and user port. 18 original games – books and accessories cost it new over £400 accept £185 Tel Wakefield 250452

BBC MODEL B + Opus DDOS + graphics + Rom + dual double sided disc drive 40T + all leads manuals software etc Will sell for £550 ono Tel Ongar (0277) 362487

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ELECTRON & BBC TAPE RECORDER + 12 original games (inc Elite and Chucky Egg) plus three books First Byte interface and Joystick mags. Cost £400 sell £190 Tel 0642 551040 after 4pm

BBC S/W FOR SALE inc Micropower games adventures arcade and utilities some discs £3.50 Originals only Chris Tel 01 386 7130 after 5pm

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BBC B 1.2 O/S nine months old VGC plus 2 Beebugsoft Eprom Toolkit and Exmen 2 plus 10 programs £325 ono Tel 07816 5490

BBC B original games Monsters and Starship Command by Acornsoft any offers? Tel Raj on 021-486 2312 after 5pm

ELECTRON tape recorder + 3 books + 12 original games – First Byte Joystick interface + a joystick + many mags if wanted £190 quick sale Tel 0642 551040 after 4pm (ask for Peter)

BBC Beebug Sprite utilities disk plus packing and instructions etc as new £8 ono Also Galaxy Invader 1000 £5 Want cheap Cheetah speech synth Tel 0284 4628

BBC MODEL B for sale all leads boxed £235 Tel 0472 888294

BBC B OS 1.2 nearly new leave books + some s/w £270 David Lead 43 White Ground Estate London SE1

ACORN ELECTRON – 1 expansion BBC recorder 2 joysticks lots of s/w books and mags as new £250 Tel 01 902 5036 (Percival)

BBC B £300 3 months old with joystick interface + software Tel 01 542 7848

ACORN Electron plus 1 joystick/printer interface unused £88 lots of Electron software like updated Elite Twin King 747 also 14 Electron User mags £7 the lot Tel Bishops Caundle 468

SOFTWARE for sale Acorn Electron eight programs including Elite Chess Classic Adventure The Mine Felix in the Factory sell £20 Tel Little Gaddesden 3557 after 5pm Originals only

ELECTRON Adventure game Pyramid of Doom Scott Adams sell £4 Tel Little Gaddesden 3557 after 5pm Originals only

BBC B OS.801 and OS/401 discs in case with plus 32k [illegible] sideways ZIF socket, joystick 40 disks in plastic cases £450 No offers Tel High Wycombe (0494) 451103 evenings

ACORN Electron 1 month old boxed and guaranteed games + mags £150 ono Tel Horsforth 42642 after 4pm

BBC B software all original branded games educational etc on cassette Approx 30 cassettes plus light pen fantastic bargain! £35 the lot! Will post if required Tel 0244 675717

BBC Model A upgraded 32k 1.2 OS + 4622 chip joysticks tape recorder software + books and magazines Hardly used In original box £275 ono Tel Hillingdon (0895) 52941

BBC B 1.2O/S OPUS Double Density disk interface double sided double density 40/80T switchable Mitsubishi 400k disk drive giving 800k capacity Quickshot joystick + interface + utilities disk £800 [illegible] 831433 [illegible]

ZX81s for Sale

ZX81 [illegible] Tel Derby 45115

ZX81 SOFTWARE, 15 original titles including Maze £6 Defender Black Crystal Adventure I Namtir Raiders Inca Curse etc £2 each £20 the lot. Write 131 London Road Stone Dartford Kent

ZX81 16K Memotech keyboard manual leads etc + 5 tapes £30 Tel 0254 28786

SINCLAIR 16K Ram pack for ZX81 £10 ono Gordon 0822 751560

16K ZX81 Tricord 3 channel sound amazing sound 8 ton connector mags manual plenty s/w £55 ono Tel 0602 282455

16K ZX81 11 games inc Flight Simulator Vu File M Coder 2 ZX AS Assembler Manuals + Books Machine Code + Mags £40 Tel 0225 38 37

ZX81 16K Memotech Keyboard manual all leads 5 tapes £68 Tel 02603 28786

ZX81 16K RAM Pack Maplin keyboard power supply all mounted in metal console incl all leads 2 manuals + mags £50 Tel Rochdale (0706) 40683 evenings or weekends

ZX81 16K Memotech Fuller keyboard ZX printer earning lab 10 books many programs £80 ono or swap for an electron 0734 413647 (Reading)

ADVENTURE HELPLINE

Hobbit on Spectrum I have found Thorin's key but I cannot get out of the goblin's dungeon. T P Saunders 28 Western Road, Kilmarnock, Strathclyde

Hobbit on Commodore 64. I am stuck in the goblin's dungeon. I cannot answer Gollum's first riddle. S Coyne Garden Flat Rougemont East Hill Road Ryde Isle of Wight PO33 1LS

Eureka on Spectrum In the village what do you do with the pot of boiling liquid? How do I cross the desert? Jim White 12 Crossways Camphill Newport, Isle of Wight PO30 5PE.

Castle of Terror on Commodore 64. I cannot get into the castle – never mind trying to defeat the terrors within! Pauline Joddrell, 16 Pendennis Road, Heaton Norris Stockport Cheshire SK4 2QA.

Fantasia Diamond on Amstrad I can't find a way to cross the rushing river or open the little black window in the caves. P C Hill 22 Bradleymore Road Brierley Hill West Midlands

Valhalla on Spectrum. I can't find Ofnir or Drapnir Paul Coder 168 Granhill Close Greenlands Redditch, Worcs B98 7PS

Zork I on Commodore 64. How do I inflate the pile of plastic and with what do I kill the thief in his lair? Mark Hughes 4A Stratford Way Noctorum, Birkenhead Merseyside L43 9HF

Secret Mission on BBC. How do I open the yellow and blue doors? Stephen Wood 29 Winser Crescent Berwick on Tweed Northumberland TD15 1NT

Planet of Death on Spectrum How do I get past the forcefield? Where is the laser? Graham Scott 10 Oakfield Road Lobley Hill Gateshead Tyne and Wear

Hampstead on Spectrum. How do I open the filing cabinet in my office? Dave Hook 46 61 Michaels Road Kirkham Preston, Lancs PR4 2TQ

Ring of Darkness on Dragon How do you climb the mountains? How do you use a cart when you have bought it? Mark Jades Lavane Sandybed Lane Scarborough, N Yorks YO12 5LJ

Zkul on QL Where is the boat for the Oak and how do you get the red dwarf to appear for the £1 reward? Fred Pattenham, 111 Elgin Crescent London W11 2JE.

Hobbit on Spectrum I cannot get past the black river Can the gate to Mirkwood be opened? Chris Johnson, 203 Kentmere Avenue, Seacroft, Leeds 14

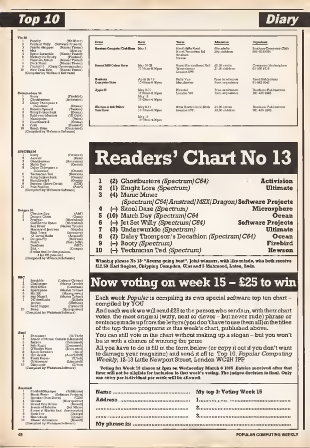
Mystery of Munroe Manor on C64 I can't get anywhere. Please help on the stairs, study and dining hall. Martin Silvester 77 High Cross Sedgley W Midlands

Franklins Tomb on Dragon How do you get to the water room? Andy Marsh, 41 Central Avenue, Bury, Lancs

Denis through the Drinking Glass on Spectrum How do you get out of No 10? Shaun Taylor 11 Albany Way Skegness Lincs

Eureka! on Spectrum. Where do I find the code for the door number pad in the Caribbean adventure? I can help with any of the other adventures Andrew Hartley 83 Main Rd Nether Kellet Carnforth Lancs.

Tir Na Nog on Spectrum. What must Cuchulainn do to reunite the four pieces of the seal of Calum? Andrew Hartley 83 Main Rd Nether Kellet Carnforth Lancs



Top 10

Vic 20

1. Punchy (Mr Micro)
2. Perils of Willy (Software Projects)
3. Psycho Shopper (Mastertronic)
4. Max (Artsoft)
5. Space Scramble (Mastertronic)
6. Mickey the Bricky (Firebird)
7. Phantom Attack (Mastertronic)
8. Duck Shoot (Mastertronic)
9. Flight 015 (Craig Communication)
10. New York Blitz (Mastertronic)

(Compiled by Websters Software)

Commodore 64

1. Booty (Firebird)
2. Ghostbusters (Activision)
3. Daley Thompson's Decathlon (Ocean)
4. Seaside Special (Taskset)
5. Kong Strikes Back (Ocean)
6. Raid over Moscow (US Gold)
7. Matchpoint (Psion)
8. Hunchback II (Ocean)
9. Frak (Statesoft)
10. Beach Head (Centresoft)

(Compiled by Websters Software)

SPECTRUM

1. Booty (Firebird)
2. Airwolf (Elite)
3. Ghostbusters (Activision)
4. Match Day (Ocean)
5. Daley Thompson's Decathlon (Ocean)
6. Technician Ted (Hewson)
7. Kong Strikes Back (Ocean)
8. Hunchback II (Ocean)
9. Snooker (Steve Davis) (CDS)
10. Pole Position (Atari)

(Compiled by Websters Software)

Dragon 32

1. Chuckie Egg (A&F)
2. Dragon Chess (Oasis)
3. Frogger (Microdeal)
   Cuthbert in Space (Microdeal)
   Bug Diver (Mastertronic)
   Mystery of Java Star (Shards)
   Back Track (Incentive)
   O Level Maths (Ampsoft)
9. Dragon Fly (Hewson)
   Pedro (Beau Jolly)
   Database (MST)
   Edit (Compsoft)

(6 titles tied for 4th position, 4 for 9th position)
(Compiled by Websters Software)

BBC

1. Scrabble (Leisure Genius)
2. Challenger (Mastertronic)
3. Mini Office (Database)
4. Spectipede (Mastertronic)
5. Mr EE (Micropower)
6. Star Maze II (Mastertronic)
7. 747 simulator (D/Soft)
   Jet Pac (Ultimate)
   Gold Digger (Firebird)
10. Swag (Micropower)

(Compiled by Websters Software)

Atari

1. Encounter (Hi Tech)
2. Attack of Mutant Camels (Llamasoft)
3. Zaxxon (Centresoft)
4. Solo Flight (Centresoft)
5. O'Reilly's Mine (Domark)
6. Space Invaders (Atari)
7. Orc Attack (Acorn Soft)
8. Every Ropper (E/Soft)
9. Gridrunner (Llamasoft)
10. Diamonds (Epics)

(Compiled by Websters Software)

Amstrad

1. Football Manager (Addictive)
2. Manic Miner (Software Projects)
3. Snooker (Steve Davis) (CDS)
4. Ghouls (Micropower)
5. Grand Prix Driver (Amsoft)
6. Jewels of Babylon (Int Micro)
7. Forest at Worlds End (Interceptor)
8. Dark Star (Design)
9. Hunchback (Ocean)
10. Classic Adventure (Amsoft)

(Compiled by Websters Software)

Diary

Event	Date	Venue	Admission	Organisers
Brixham Computer Club Show	Mar 2	Northcliffe Hotel, North Furzeham Rd, Brixham, Devon	60p adults, 30p children	Brixham Computer Club, 080 45 55384
Second 1MB Colour Show	Mar 30-31, 10.00am-6.00pm	Royal Horticultural Hall, Westminster, London SW1	£2.50 adults, £1.50 children	Computer Marketplace, 01-930 1612
Northern Computer Show	April 16-18, 10.00am-6.00pm	Belle Vue, Manchester	Free in advance from organisers	Reed Exhibitions, 01-643 8040
Apple 85	May 9-10, 10.00am-6.00pm; May 11, 10.00am-4.00pm	Novotel, London W6	Free in advance from organisers	Database Publications, 061-456 8383
Electron & BBC Micro User Show	May 9-11, 10.00am-6.00pm; May 12, 10.00am-4.00pm	New Horticultural Halls, London SW1	£3.00 adults, £2.00 children	Database Publications, 061-456 8383

Readers' Chart No 13

1	(2)	Ghostbusters *(Spectrum/C64)*	**Activision**
2	(1)	Knight Lore *(Spectrum)*	**Ultimate**
3	(4)	Manic Miner *(Spectrum/C64/Amstrad/MSX/Dragon)*	**Software Projects**
4	(–)	Skool Daze *(Spectrum)*	**Microsphere**
5	(10)	Match Day *(Spectrum/C64)*	**Ocean**
6	(–)	Jet Set Willy *(Spectrum/C64)*	**Software Projects**
7	(3)	Underwurlde *(Spectrum)*	**Ultimate**
8	(7)	Daley Thompson's Decathlon *(Spectrum/C64)*	**Ocean**
9	(–)	Booty *(Spectrum)*	**Firebird**
10	(–)	Technician Ted *(Spectrum)*	**Hewson**

Wining phrase No 13: "Acorns going bust". Joint winners, with like minds, who both receive £12.50: Karl Hughes, Chipping Campden, Glos and S Mahmood, Luton, Beds.

Now voting on week 15 – £25 to win

Each week *Popular* is compiling its own special software top ten chart – compiled by YOU

And each week we will send £25 to the person who sends in, with their chart votes, the most original (witty, neat or clever – but never rude) phrase or sentence made up from the letters (you don't have to use them all) in the titles of the top three programs in this week's chart, published above.

You can still vote in the chart without making up a slogan – but you won't be in with a chance of winning the prize

All you have to do is fill in the form below (or copy it out if you don't want to damage your magazine) and send it off to Top 10, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP

Voting for Week 15 closes at 2pm on Wednesday March 6 1985. Entries received after that time will not be eligible for inclusion in that week's voting. The judges decision is final. Only one entry per individual per week will be allowed.

Name .... **My top 3: Voting Week 15**
Address .... 1.....................................
.... 2.....................................
.... 3.....................................
My phrase is: ....

New Releases

AN ALIBI

The first bunch of programs from Ariolasoft were, I felt, a mixed bunch

Whilst most of them had been hits in America this did not detract from the fact that many of the games were fairly hackneyed and unexciting

You almost got the impression that Ariolasoft did not themselves know what a good game is and instead relied on the security of 'charting' in America, to make a decision to import

Murder on the Zinderneuf is the latest release from the company and it has both many virtues and appalling weaknesses Among the latter are graphics so small and badly designed that it is nearly impossible to tell what is going on, where your main character is, and to discern one object from another True enough it's not supposed to be an arcade game but the graphics really are dreadful.

However, the structure of the game, the tone and a good many of the ideas are actually excellent – it works like a sort of roving *Cluedo* You choose a character – a famous detective – and in doing so select one of a number of alternative plots Aboard the Zinderneuf, a mighty airship, a murder has been committed. Using clues, interrogations of relevant witnesses, making connections, dissolving alibis, you must discover who did the deed before the airship docks (do airships dock?) – time ticks away in the corner of the screen.

The process of collecting clues and interrogating witnesses occurs graphically – you move a blob of a sprite around a layout of the Zinderneuf Here and there you may meet other blobs wandering about representing other characters Bump into one and using joystick commands you may ask questions about a variety of subjects relevant

What you have here is a reversal of the usual case – a program full of ideas which is poorly programmed. How much that matters depends on how much the poor graphics distract you from the qualities of the game

One other thing could well detract is the unbelievable price of £11 95

Program *Murder on the Zinderneuf*
Price *£11 95*
Micro *Commodore 64*
Supplier *Retail*

COLLISION

Utility programs for the Spectrum come and go with few lasting more than a few months So one has to admire any company that puts one out at £13 95 with a glossy package and a complete book

The daredevil in question is McGraw Hill and *The Spectrum Graphics Machine* is the program in question. What you get is a utility program called *Goldmine* and a book of 130 pages explaining how to use what is, in effect, a series of new Rom routines

All Spectrum Rom graphics routines have been completely replaced with faster, neater variants that use the full 23*31 screen The new routines can be used in Basic or machine code in the normal way Extras include sprites with pixel collision detection and Window Roll/Scroll commands – you even get a few sound effects thrown in.

It's an impressive package, but the help it provides is at a pretty sophisticated level Although you can improve your Basic programs somewhat, it's really most useful as a series of ready packaged routines for machine code programmers. The manual is good explaining how to use each command, but does assume familiarity with Basic and some sense of machine code One of those programs that is vital for some and incomprehensible to others

Program *The Spectrum Graphics Machine*
Price *£13 95*
Micro *Spectrum*
Supplier *McGraw Hill Book Company Maidenhead Berks*

HAZARDS



Just when you thought BBC software was getting really impressive, with the likes of *Elite* and *Castle Quest* showing what can be done with severe memory limitations, along comes something as dire as *Orpheus* from A & F Software True enough *Orpheus* cost half of what the mega-programs cost but it isn't even an eighth as good.

Orpheus is like a simplified *Frogger* There is a river which has a current, you have a boat, move boat across river using left right to steer, collect harp, return, dodge rocks and monsters, destroy latter with a discus Three minutes into the game I realised that this was all there was to it – the seven screens mentioned in the blurb are the same screen with a few more hazards each time Being as generous as possible, the graphics are nice but there just isn't enough to the game.

Program *Orpheus*
Price *£8·90*
Micro *BBC*
Supplier *A & F Unit 8 Canal Side Industrial Estate Woodbine Street East Rochdale Lancashire*

This Week

Program	Type	Micro	Price	Supplier
Chopper Squad	Arc	Amstrad	£6 00	Interceptor
Speak Loot	Arc	Amstrad	£7.95	Andtronic
Decision Maker	Ed	Amstrad	£24 95	Amsoft
Masterfile	Ed	Amstrad	£24.95	Amsoft
Project Planner	Ed	Amstrad	£24.95	Amsoft
Flight Simulation	S	Amstrad	£71.95	Myrddin
Osprey	S	Amstrad	£7.95	Amsoft
Music Composer	Ut	Amstrad	£6 95	Kuma
Feagit	Arc	Aquarius	£2.49	D Spenser
Scrambler	Arc	Aquarius	£2.95	D Spencer
Banjex	Arc	BBC	£9 95	Robico
Caveman Capers	Arc	BBC	£7.95	Icon
Transposition Formul	Ed	BBC B	£8.50	HEYTS
Crazy Golf	Arc	C16/+4	£5.95	Commodore
Harbour Attack	Arc	C16/+4	£5.95	Commodore
Jack Attack	Arc	C16/+4	£5.95	Commodore
Omak Fighter	Arc	Commodore 16	£2.95	D Spencer
Maths Enhancer	Ed	Commodore 16	£6.95	D Spencer
Synthesizer	Ut	Commodore 16	£2.49	D Spencer

New Releases

PROTECTION

Osprey! is an educational program which is sufficiently entertaining to be considered a game in its own right, albeit of a stately, thoughtful kind The game is closely linked to conservation objectives and comes with a manual that includes a lot of general information and, indeed, colour pictures about ospreys and their lives

The idea of the game is to protect and preserve the birds by allocating wardens to different tasks from informing the public to watching out for egg stealers Basically, it's a management game, how many wardens should go where and at what time of year? What about factors like weather?

There is a simple graphic of the osprey nesting area which illustrates with primitive animation the changing fortune of the birds, eg a little man comes to steal their eggs if you haven't allocated enough wardens to this task

All in all, it's a good natured program with little technical merit, but enjoyable particularly if you have some sympathy with the fate of the birds.

Program *Osprey!*
Price *£7 95*
Micro *Amstrad*
Supplier *Amsoft*
Brentwood House
169 Kings Road
Brentwood
Essex CM14 4EF

SCREENED

Andtronic is a software house whose game *Spook Loot* is described as an arcade adventure with 160 screens You move a little man called Boris (as well that as any other name – at least it doesn't alliterate) around the screens, looking for keys which will open secret doors and find his way to the treasure

There are obviously baddies which drain your energy and bounce about – it's hardly original or innovative and the graphics are extremely simple, particularly the backgrounds which are all chunky blocks The 160 screens are also incredibly similar to one another

It's really a simplified *Atic Atac* and hardly pushes the Amstrad's possibilities to the limit – one virtue may be that it is easy for young kids to understand, but certainly there is little to distinguish it from similar programs

Program *Spook Loot*
Price *£7 99*
Micro *Amstrad*
Supplier *Andtronic*
28 Upper Bridge Road
Chelmsford
Essex

LAID BACK

The first flight simulation for the Amstrad comes from Myrddin software complete with mercifully brief manual and relatively few controls to remember

The box describes it as having moving 3D graphics this is true only in the *Battlezone* sense of continuously updated perspective drawn lines But in truth, the view out of the cockpit is far from impressive

Whilst not tremendously bad, there isn't much to recommend this one apart from the relative simplicity of the controls which means basic manouvres are quickly learnt.

The screen updating only happens around once a second which hardly makes for a flexible response Sound is similarly unimpressive being more like laid back crickets than throbbing motor(s).

If you're desperate for a flight simulation on your new Amstrad, this one might do, but given the possibilities of the machine I'd expect to see something a lot more impressive in the next few months and if I were you I'd wait for that.

Program *Flight Simulation*
Price *£11 95*
Micro *Amstrad*
Supplier *Myrddin Software*
PO Box 61
Swindon
SN5 8BG

BOUNCING

Icon Software has been around for a while now and has recently released two new games, *Bug Eyes* and *Caveman Capers* *Bug Eyes*, is described as an Arcade Adventure

What it is, though, is *Manic Miner* with big sprites, only 10 screens and less bizarre humour

It's dodge the obstacles by working out when to move, screen one is hydraulic presses, the next is bouncing laces with disappearing bridges and so on. It's smoothly done and to be fair had everybody in the office playing it at least once or twice, but innovative it's certainly not.

This would be the perfect game to put out at a budget price – not startling but a good couple of hours entertainment But at £6 95, I can't really get very enthusiastic about it

Program *Bug Eyes*
Price *£6 95*
Micro *Spectrum*
Supplier *Icon Software*
65 High Street
Gosforth
Tyne & Wear
NE3 4AA

This Week

Hypercircuit	Arc	Commodore 64	£7 95	Alligata
Sorcery	Arc	MSX	£8 95	Virgin Games
Boogs Boo	Arc	MSX	£7 99	Quicksilva
Spooks and Ladders	Arc	MSX	£6.95	Kuma
The Showman	Arc	MSX	£7 95	Quicksilva
Big Eyes	Arc	Spectrum	£6.95	Icon
Everyone's a Wally	Arc	Spectrum	£9 95	Mikro Gen
Hotage	Arc	Spectrum	£5 95	Interceptor
Character Redesign	Ut	Spectrum	£4 50	Lee Griffiths
STOPS	Ut	Spectrum	£1 99	Lee Griffiths
Spc Speech	Ut	Spectrum	£3 99	Lee Griffiths
Spc Speedy load	Ut	Spectrum	£4 99	Lee Griffiths
Spc Super Toolkit	Ut	Spectrum	£4.99	Lee Griffiths
Spc Zap, tings etc	Ut	Spectrum	£3 99	Lee Griffiths
Heart of Darkness	Ad	Vic 20	£3 95	Harddata
Racehorse Trainer	S	ZX81	£5.99	Gavin Barter

Key Ad – adventure
Arc – arcade
Ed – education
S – strategy-simulation
Ut – Utility

New Releases

Pick of the week

CARTOON HERO

Everyone's a Wally, it says gleefully on Mikro Gen's latest. Just when you thought you'd seen enough of this mythic cartoon hero he turns up again complete with family, every one of them a large animated sprite with colour res problems.

It's a good program, though, the crowning glory of the Wally programs so far with more things to do, a greater adventure element than ever before, more humour and neat design.

The objective of the game is to find the combination of a safe which is located in various segments of the playing area. Getting the different segments requires you to control at different times all the members of Wally's family (except the baby Herbert) and solve various problems.

If you've liked the previous Wally programs, then this one is the same only more so. Trying to get into the zoo drove me nuts for quite a long while, until I figured it out and that if you like, is a clue. One more thing – the song that comes with it is dire.

Program *Everyone's a Wally*
Price *£9.95*
Micro *Spectrum*
Supplier *Mikro Gen, 44 The Broadway, Bracknell, Berks*

TRAINER

The ZX81 is not dead. At least this is the attitude of those people still producing software for it and presumably finding it and presumably finding a market for it.

Just as Dragon software almost seemed to improve after the machine died, so ZX81 software, long after it stopped being officially supported, is (relatively) sophisticated and very cheap.

Racehorse Trainer is what a variant on *Football Manager* in which you train and race thoroughbreds trying both to win races and, more importantly, make money. Your horses can be bought and sold, improved by training, and so on.

You are kept informed of factors like stamina, fitness and energy and prize money won.

Similarly you can choose the level of quality of the jockey but you have to pay, higher quality being more expensive. So it goes, buy, sell, train and watch out for injuries and what other trainers are doing. The race is run with what are, for the ZX81, excellent graphics and wins are credited, but then you have to pay for things like horseboxes, race entry, food, rent, etc.

It's complex and in 16K reminds us of just what can be done with a bit of care. It's also very cheap.

Program *Racehorse Trainer*
Price *£2.80*
Micro *ZX81*
Supplier *Gavin Barker, 12 Fleming Field, Shotton Colliery, County Durham DH6 2JF*

COMPLETE

In the early days of the Spectrum around 25% of the software enquiries we ever got concerned one subject: "Is there a version of *Defender* available yet?"

Defender is one of those very few arcade games that possesses that elusive property, longevity, and however simple the idea starts to look there are always a group of fanatics somewhere longing to play it.

So it was with the Amstrad until now, when Alligata has released *Defend or Die*, *Defender* for short. Not only is it (I think) the first but it is also suprisingly complete. It was test played by *Popular's* resident *Defender* expert and found not to lack a single element from the original game.

Quick summary of plot: aliens taking humans from planet; blast them to bits before they can, extra points by rescuing grabbed human and dropping him/her back on the earth. lots of different baddies, many of them incredibly vicious. all fire at you, and you have a laser type weapon.

Observations from expert. Very complete, bit slow, scrolling gets a bit naff at speed, sound poor (although I should stress that it is in stereo and might sound far better put through a hi-fi which is what Alligata suggest).

Program *Defend or Die*
Price *£7.95*
Micro *Amstrad*
Supplier *Alligata Software, 1 Orange Street, Sheffield S1 4DW*

Compiled by Graham Taylor

New Releases is designed to let people know what software is coming on the market. If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

This Week

Alligata 1 Orange Street, Sheffield S1 4DW **Amsoft**, Brentwood House 169 Kings Road, Brentwood, Essex 0277 230222 **Andtronic**, 28 Upper Bridge Road, Chelmsford, Essex **Commodore** 1 Hunters Road Weldon North Industrial Est., Weldon, Corby NN17 1QX **D Spencer** 50 Cranswick Close, Billingham, Cleveland **Gavin Barker**, 12 Felming Field, Shotton Colliery, County Durham DH6 2JF 0783 261405 **HEYTS**, Lathkill Street, Market Harborough Leics LE16 9EZ **Harddata** 16 Vicarage Lane, East Ham London E6 4AB 01-552 1472 **Icon** 65 High Street Gosforth, Tyne and Wear NE3 4AA 091 2846966 **Interceptor** Interceptor Micro's Lindon House The Green Tadley Hampshire 07356 71145 **Kuma** Kuma Computers 12 Horseshoe Park, Pangbourne RG8 7JW 07357 4335 **Lee Griffiths** 9 Heys Avenue Reinford, Merseyside WA11 8AW **Mikro Gen** 44 The Broadway, Bracknell Berks 0344 427317 **Myrddin**, PO Box 61 Swindon, Wilts 0793 40661 **Quicksilva**, Palmerston Park House, 13 Palmerston Road, Southampton, Hampshire SO1 1LL 0703 20169 **Robico** 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH 0443 227354 **Virgin Games** 2-4 Vernon Yard Portobello Road London W11 2DX

Optical transistor

After last week's Ziggurat on the potential of optical computers and optical transistors – transphasors – here a Part 2 a rough idea of how an optical transistor can be made to work.

To create an optical equivalent of a silicon transistor a device must be built in which the passage of a very strong light beam (a large electric current in the case of an ordinary transistor) across the component is controlled by the presence or absence of an altogther smaller light beam (or current). Using a small light (or current) to control a much bigger one forms the basic of a simple amplifier

The device is constructed from two mirrors, placed with their faces parallel, a fixed distance apart (see the diagram) The mirrors are chosen so that they only reflect 90% of the light striking them, allowing 10% to pass through. Consequently laser light striking the first mirror will be partly transmitted and that transmitted light will 'bounce' back and forth in the cavity between the two mirrors.

Ordinary light is composed of waves, making the above picture more complex. If you look at what happens when a drop of water falls into a bowl of water you'll see what I mean. Initially the drop sets up a series of concentrically circular waves, but when these waves bounce off the sides of the glass they interact with each other When a trough meets a crest they cancel out leaving flat water but when two troughs or two crests meet they double in height

Now think again of the light beam 'bouncing' around in the mirror cavity Because it is a laser beam it is a wave of a single wavelength. In most often, many troughs and crests will meet and the beam will almost cancel itself out This will leave little light to be transmitted through the second mirror (A, in the diagram)

However, there is an exception – if an exactly whole number of waves fit in the cavity then, as they bounce back and forth, crests will reinforce crests and troughs will reinforce troughs meaning that the intensity of light in the cavity will grow This will continue until, eventually, the light leaving the second mirror will be nearly as powerful as that entering the first (B, in the diagram)

Here, then, is the basis for the optical transistor

Light is either transmitted through the device or not, depending on its wavelength

But the wavelength of the laser light between the mirrors can be changed by filling the gap with a material other than air – wavelength of a light beam is dependent on the density of the material it is passing through.

The clever trick now is to fill the gap with a certain special type of material which has what is called a non linear refractive index What this means is that its density changes according to the intensity of light falling on it

The optical transistor is then produced with a second, weak, laser beam focused on the mirror gap controlling – by being switched on or off – a much larger transmission of laser light across the mirror gap The weak laser changes the density of the material enough in the gap enough to change the conditions, from (in the diagram) A to B

Hey presto! You have a laser device that has all the same characteristics as a conventional silicon transistor

Of course, nothing is simple There is much more work yet before the optical transistor will rival its silicon counter part.

Giant Counsell

A whole number

Puzzle No 147

Can you solve this unusual problem. First, take the nine digits one to nine (excluding zero) and mix them up to form a nine-digit number (with all its digits different) Then add one million, and find the square root of your total.

If you have started with a particular nine-digit number you should now have a result that is both a whole number and is palindromic, ie, it reads the same forwards as backwards

The chances are that this will not have happened, but can you say what number you should have started with.

Solution to puzzle No 142

Clearly we need to find a multiplication of a two-digit and three-digit number, which produces a five-digit product ending in a '1' with all other digits different.

```
10 FOR C=3 TO 7 STEP 4
20 LET E=10-C
30 FOR A=2 TO 9
40 IF A=C OR A=E THEN GOTO 230
50 FOR B=0 TO 9
60 IF B=A OR B=C OR B=E OR B=1 THEN
 GOTO 220
70 FOR D=2 TO 9
80 IF D=C OR D=E OR D=A OR D=B THEN
 GOTO 210
90 LET P=(A*100+B*10+C)*(D*10+E)
100 IF P>98765 OR P<10234 THEN GOTO 210
110 LET P$=STR$(P)
120 FOR M=1 TO 4
130 FOR N=M+1 TO 5
140 IF MID$(P$,M,1)=MID$(P$,N,1)THEN
 GOTO 210
150 NEXT N,M
160 FOR N=1 TO 5
170 LET V=VAL(MID$(P$,N,1))
180 IF V=A OR V=B OR V=C OR V=D OR V=E
 THEN GOTO 210
190 NEXT N
200 PRINT A;B;C;"*";D;E;"=";P$
210 NEXT D
220 NEXT B
230 NEXT A
240 NEXT C
```

As the product ends in a '1' the two numbers being multiplied must end in a 7 and a 3 From this we can write the following program.

Winner of Puzzle 142

The winner of Puzzle 142 is A C Willgoose of Mansfield Nottinghamshire, who receives £10

The Hackers







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